SEQUENCE LISTING

5			
	<110>	Wesley, Susan V. Waterhouse, Peter Helliwell,Christopher A.	
10	<120>	Method and means for producing efficient silencing constructs using recombinational cloning	
	<130>	HELLGA	
15	<160>	26	
	<170>	PatentIn version 3.1	
20	<210><211><211><212><213>	25	
25	<220> <223>	core sequence of recombination site attB1	
30	<400> agcctg	1 yettt tttgtacaaa ettgt	25
35	<210><211><211><212><213>	25	
	<220> <223>	core sequence of recombination site attB2	
40	<400> agcctg	2 cttt cttgtacaaa cttgt	25
45	<210><211><211><212><213>	25	
50	<220> <223>	core sequence of recombination site attB3	
	<400> acccag	3 cttt cttgtacaaa cttgt	25
55	<210><211><211><212><213>		
60	<220> <223>		

```
<400> 4
          gttcagcttt tttgtacaaa cttqt
                                                                                25
      5
          <210> 5
          <211> 25
          <212> DNA
          <213> Artificial sequence
     10
          <220>
          <223> core sequence of recombination site attR2
          <400> 5
          gttcagcttt cttgtacaaa cttgt
                                                                                25
     15
          <210> 6
          <211>
                 25
          <212> DNA
     20
          <213> Artificial sequence
          <220>
<223> core sequence of recombination site attR3
    25
          <400> 6
          gttcagcttt cttgtacaaa gttgg
                                                                               25
          <210> 7
    30
          <211>
                 25
          <212> DNA
          <213> Artificial sequence
          <220>
    35
          <223> core sequence of recombination site attL1
          <400> 7
          agcctgcttt tttgtacaaa gttgg
                                                                               25
    40
          <210> 8
          <211>
                25
          <212> DNA
          <213> Artificial sequence
    45
          <220>
         <223> core sequence of recombination site attL2
         <400> 8
    50
         agcctgcttt cttgtacaaa gttgg
                                                                               25
         <210> 9
         <211> 25
    55
         <212> DNA
         <213> Artificial sequence
         <220>
         <223> core sequence of recombination site attL3
    60
         <400> 9
         acccagcttt cttgtacaaa gttgg
                                                                               25
```

```
<210>
             10
       <211>
             25
       <212>
             DNA
      <213>
             Artificial sequence
      <220>
      <223>
             core sequence of recombination site attP1
 10
      <400> 10
      gttcagcttt tttgtacaaa gttgg
                                                                             25
      <210> 11
 15
      <211>
             25
      <212> DNA
      <213> Artificial sequence
      <220>
20
      <223>
            core sequence of recombination site attP2,P3
      <400> 11
      gttcagcttt cttgtacaaa gttgg
                                                                             25
25
      <210> 12
      <211> 1188
      <212> DNA
      <213> Artificial sequence
30
      <220>
      <223>
             cDNA sequence of the Arabidopsis thaliana chalcone synthase codin
             g region
35
      <400> 12
      atggtgatgg ctggtgcttc ttctttggat gagatcagac aggctcagag agctgatgga
                                                                             60
      cctgcaggca tcttggctat tggcactgct aaccctgaga accatgtgct tcaggcggag
                                                                            120
      tatectgact actaetteeg cateaceaac agtgaacaca tgacegacet caaggagaag
                                                                            180
      ttcaagcgca tgtgcgacaa gtcgacaatt cggaaacgtc acatgcatct gacggaggaa
                                                                            240
40
     ttcctcaagg aaaacccaca catgtgtgct tacatggctc cttctctgga caccagacag
                                                                            300
      gacatcgtgg tggtcgaagt ccctaagcta ggcaaagaag cggcagtgaa ggccatcaag
                                                                            360
      gagtggggcc agcccaagtc aaagatcact catgtcgtct tctgcactac ctccggcgtc
                                                                            420
      gacatgeetg gtgetgacta ceageteace aagettettg gteteegtee tteegteaag
                                                                            480
     cgtctcatga tgtaccagca aggttgcttc gccggcggta ctgtcctccg tatcgctaag
                                                                            540
45
     gatctcgccg agaacaaccg tggagcacgt gtcctcgttg tctgctctga gatcacagcc
                                                                            600
     gttaccttcc gtggtccctc tgacacccac cttgactccc tcgtcggtca ggctcttttc
                                                                            660
     agtgatggcg ccgccgcact cattgtgggg tcggaccctg acacatctgt cggagagaaa
                                                                            720
     cccatctttg agatggtgtc tgccgctcag accatccttc cagactctga tggtgccata
                                                                            780
     gacggacatt tgagggaagt tggtctcacc ttccatctcc tcaaggatgt tcccggcctc
                                                                            840
50
     atctccaaga acattgtgaa gagtctagac gaagcgttta aacctttggg gataagtgac
                                                                            900
     tggaactccc tcttctggat agcccaccct ggaggtccag cgatcctaga ccaggtggag
                                                                            960
     ataaagctag gactaaagga agagaagatg agggcgacac gtcacgtgtt gagcgagtat
                                                                           1020
     ggaaacatgt cgagcgcgtg cgttctcttc atactagacg agatgaggag gaagtcagct
                                                                           1080
     aaggatggtg tggccacgac aggagaaggg ttggagtggg gtgtcttgtt tggtttcgga
                                                                          1140
55
     ccaggtctca ctgttgagac agtcgtcttg cacagcgttc ctctctaa
                                                                          1188
     <210> 13
     <211>
            18691
60
     <212>
            DNA
     <213> Artificial sequence
```

MARKER STORMER AND MINISTRALE STREET THE STREET STR

```
<220>
      <223>
             acceptor vector pHELLSGATE
      <220>
  5
      <221> misc_feature
      <222>
             (7922)..(9985)
             spectinomycin resistance
      <220>
10
      <221> misc feature
      <222> (10706)..(11324)
      <223> right T-DNA border fragment
      <220>
15
      <221> misc_feature
      <222>
             (11674)..(13019)
      <223> CaMV35S promoter fragment
      <220>
20
      <221> misc_feature
      <222>
            (17890)..(17659)
      <223> attP1 recombination site (complement)
      <220>
25
      <221> misc_feature
      <222>
            (17610)..(16855)
      <223> ccdB selection marker (complement)
      <220>
30
      <221> misc_feature
      <222>
            (16551)..(16319)
      <223> attP2 recombination site (complement)
      <220>
35
     <221> misc_feature
     <222> (14660)..(16258)
      <223> pdk2 intron 2
      <220>
40
      <221>
            misc feature
      <222>
            (15002)..(15661)
      <223>
            chloramphenicol resistance gene
     <220>
45
            misc_feature
     <221>
     <222>
            (14387)..(14619)
     <223>
            attP2 recombination site
     <220>
50
     <221> misc feature
     <222> (13675)..(13980)
     <223> ccdB selection marker (complement)
     <220>
55
     <221> misc_feature
     <222>
            (13048)..(13279)
     <223> attP1 recombination site
     <220>
60
     <221> misc_feature
     <222>
            (17922)..(18687)
     <223> octopine synthase gene terminator region
```

H.

LF |

```
<220>
       <221>
             misc_feature
       <222>
              (264)..(496)
             nopaline synthase gene promoter
      <220>
      <221>
             misc feature
      <222>
              (497)..(1442)
 10
      <223>
             nptII coding region
      <220>
      <221>
             misc_feature
      <222>
             (1443)..(2148)
 15
             nopaline synthase gene terminator
      <220>
      <221>
             misc_feature
      <222>
             (2149)..(2706)
20
      <223>
             a left T-DNA border region
      <400> 13
      ggccgcacta gtgatatccc gcggccatgg cggccgggag catgcgacgt cgggcccaat
                                                                              60
      tcgccctata gtgagtcgta ttacaattca ctggccgtcg ttttacaacg tcgtgactgg
                                                                             120
25
      gaaaaccctg gcgttaccca acttaatcgc cttgcagcac atcccccttt cgccagctgg
                                                                             180
      cgtaatagcg aagaggcccg caccgatcgc ccttcccaac agttgcgcag cctgaatggc
                                                                             240
      gaatggaaat tgtaaacgtt aatgggtttc tggagtttaa tgagctaagc acatacgtca
                                                                             300
      gaaaccatta ttgcgcgttc aaaagtcgcc taaggtcact atcagctagc aaatatttct
                                                                             360
      tgtcaaaaat gctccactga cgttccataa attcccctcg gtatccaatt agagtctcat
                                                                             420
30
      atteactete aateeaaata atetgeaatg geaattacet tateegeaac ttetttacet
                                                                            480
      attteegeee ggateeggge aggtteteeg geegettggg tggagagget atteggetat
                                                                            540
      gactgggcac aacagacaat cggctgctct gatgccgccg tgttccggct gtcagcgcag
                                                                            600
      gggcgcccgg ttctttttgt caagaccgac ctgtccggtg ccctgaatga actgcaggac
                                                                            660
      gaggcagcgc ggctatcgtg gctggccacg acgggcgttc cttgcgcagc tgtgctcgac
                                                                            720
35
      gttgtcactg aagcgggaag ggactggctg ctattgggcg aagtgccggg gcaggatctc
                                                                            780
      ctgtcatctc accttgctcc tgccgagaaa gtatccatca tggctgatgc aatgcggcgg
                                                                            840
      ctgcatacgc ttgatccggc tacctgccca ttcgaccacc aagcgaaaca tcgcatcgag
                                                                            900
      cgagcacgta ctcggatgga agccggtctt gtcgatcagg atgatctgga cgaagagcat
                                                                            960
      caggggctcg cgccagccga actgttcgcc aggctcaagg cgcgcatgcc cgacggcgag
                                                                           1020
40
      gatetegteg tgacccatgg egatgeetge ttgeegaata teatggtgga aaatggeege
                                                                           1080
      ttttctggat tcatcgactg tggccggctg ggtgtggcgg accgctatca ggacatagcg
                                                                           1140
      ttggctaccc gtgatattgc tgaagagett ggcggcgaat gggctgaccg cttcctcgtg
     ctttacggta tcgccgctcc cgattcgcag cgcatcgcct tctatcgcct tcttgacgag
                                                                           1260
      ttcttctgag cgggactctg gggttcgaaa tgaccgacca agcgacgccc aacctgccat
                                                                           1320
45
     cacgagattt cgattccacc gccgccttct atgaaaggtt gggcttcgga atcgttttcc
                                                                           1380
     gggacgccgg ctggatgatc ctccagcgcg gggatctcat gctggagttc ttcgcccacc
                                                                           1440
     ccgatccaac acttacgttt gcaacgtcca agagcaaata gaccacgaac gccggaaggt
                                                                           1500
     tgccgcagcg tgtggattgc gtctcaattc tctcttgcag gaatgcaatg atgaatatga
                                                                           1560
     tactgactat gaaactttga gggaatactg cctagcaccg tcacctcata acgtgcatca
                                                                           1620
50
     tgcatgccct gacaacatgg aacatcgcta tttttctgaa gaattatgct cgttggagga
     tgtcgcggca attgcagcta ttgccaacat cgaactaccc ctcacgcatg cattcatcaa
                                                                           1740
     tattattcat gcggggaaag gcaagattaa tccaactggc aaatcatcca gcgtgattgg
                                                                           1800
     taacttcagt tccagcgact tgattcgttt tggtgctacc cacgttttca ataaggacga
                                                                           1860
     gatggtggag taaagaagga gtgcgtcgaa gcagatcgtt caaacatttg gcaataaagt
                                                                           1920
55
     ttcttaagat tgaatcctgt tgccggtctt gcgatgatta tcatataatt tctgttgaat
                                                                           1980
     tacgttaagc atgtaataat taacatgtaa tgcatgacgt tatttatgag atgggttttt
                                                                           2040
     atgattagag tecegeaatt atacatttaa taegegatag aaaacaaaat atagegegea
                                                                           2100
     aactaggata aattatcgcg cgcggtgtca tctatgttac tagatcgaat taattccagg
                                                                           2160
     cggtgaaggg caatcagctg ttgcccgtct cactggtgaa aagaaaaacc accccagtac
                                                                           2220
60
     attaaaaacg teegeaatgt gttattaagt tgtetaageg teaatttgtt tacaecacaa
                                                                           2280
     tatateetge caccagecag ccaacagete ceegacegge ageteggeac aaaateacea
                                                                           2340
     ctcgatacag gcagcccatc agtccgggac ggcgtcagcg ggagagccgt tgtaaggcgg
                                                                           2400
     cagactttgc tcatgttacc gatgctattc ggaagaacgg caactaagct gccgggtttg
                                                                           2460
```

ħ,

	aaacacggat	gatetegege	, agggtagcat	: gttgattgta	acgatgacag	agcgttgctg	2520
	cctgtgatca	ı aatatcatct	: ccctcgcaga	a gatccgaatt	atcagccttc	ttattcattt	2580
	ctcgcttaac	cgtgacaggc	: tgtcgatctt	gagaactatg	ccgacataat	aggaaatcgc	2640
_	tggataaago	cgctgaggaa	gctgagtgg	gctatttctt	tagaagtgaa	cgttgacgat	2700
5	gtcgacggat	cttttccgct	gcataaccct	: acttcaaaat	cattatagcg	attttttcgg	2760
	tatatccatc	: ctttttcgca	cgatatacac	gattttgcca	aagggttgg	gtagactttc	2820
	cttaatatat	ccaacggcgt		, gaeteegeea	aagggcccgc	cccgcgagcg	
	gatatteett	cttcactoto	cattettac	ggataggtga	agtaggccca	ceegegageg	2880
	tacasaacta	. ccccactgcc	coccaccogo	acciggeggi	gercaaeggg	aatcctgctc	2940
10	cgcgaggccg	geeggetaee	geeggegtaa	cagatgaggg	caagcggatg	gctgatgaaa	3000
10	ccaagccaac	caygygrgat	getgecaaet	tactgattta	gtgtatgatg	gtgtttttga	3060
	ggtgetecag	tggettetgt	ttctatcago	: tgtccctcct	gttcagctac	tgacggggtg	3120
	gtgcgtaacg	gcaaaagcac	cgccggacat	cagcgctatc	tctgctctca	ctgccgtaaa	3180
	acatggcaac	tgcagttcac	ttacaccgct	tctcaacccg	gtacgcacca	gaaaatcatt	3240
	gatatggcca	. tgaatggcgt	tggatgccgg	gcaacagccc	gcattatqqq	cattaacctc	3300
15	aacacgattt	tacgtcactt	aaaaaactca	ggccgcagtc	ggtaacctcg	cgcatacagc	3360
	cgggcagtga	catcatcatc	tacacaaaaa	. tggacgaaca	atagaactat	atcacacata	3420
	aatcqcqcca	acactaacta	ttttacacat	atgacagtct	ccccaaacac	gttgttggcta	
	acqtattcqq	taaacacact	atoggaga	tagacagtat	totagaagacg	guiguigege	3480
	ttgacgtgg	gatatgata	acggcgacgc	tggggcgtct	Laugageetg	ctgtcaccct	3540
20	agatagagat	gatatggatg	acggatggct	ggccgctgta	tgaatcccgc	ctgaagggaa	3600
20	agetgeacgt	aaccagcaag	cgatatacgc	agcgaattga	gcggcataac	ctgaatctga	3660
	ggcagcacct	ggcacggctg	ggacggaagt	cgctgtcgtt	ctcaaaatcg	gtggagctgc	3720
	atgacaaagt	catcgggcat	tatctgaaca	taaaacacta	tcaataagtt	ggagtcatta	3780
	cccaaccagg	aagggcagcc	cacctatcaa	ggtgtactgc	cttccagacg	aacqaaqaqc	3840
0.5	gattgaggaa	aaggcggcgg	cggccggcat	gagcctgtcg	gcctacctgc	tagccatcaa	3900
25	ccagggctac	aaaatcacgg	gcgtcgtgga	ctatgagcac	qtccqcqaqc	tggcccgcat	3960
	caatggcgac	ctgggccgcc	tgggcggcct	gctgaaactc	taactcacca	acgacccgcg	4020
	cacggcgcqq	ttcqqtqatq	ccacgatect	cgccctgctg	gcgaagatcg	aagagaagag	4080
	ggacgagctt	ggcaaggtca	tgatgggcgt	ggtccgcccg	accacacaca	aataaattt	
	ttagccgcta	aaacggccgg	agaatacaca	tgattgccaa	agggcagagc	atagactitt	4140
30	tcaagaagag	caacttcaca	gaggegegeg	tgattgccaa	geaegreeee	atgegeteea	4200
	accacaacca	caaccaaaaa	gagetggtat	tcgtgcaggg	caagattcgg	aataccaagt	4260
	togagaagga	cggccagacg	geetaeggga	ccgacttcat	tgccgataag	gtggattatc	4320
	tagagagaaat	ggcaccagge	gggtcaaatc	aggaataagg	gcacattgcc	ccggcgtgag	4380
	ceggggeaat	cccgcaagga	gggtgaatga	atcggacgtt	tgaccggaag	gcatacaggc	4440
35	aagaactgat	cgacgcgggg	ttttccgccg	aggatgccga	aaccatcgca	agccgcaccg	4500
33	Leatgegtge	gccccgcgaa	accttccaqt	ccqtcqqctc	gatggtccag	caagetaegg	4560
	ccaagatcga	gcgcgacagc	gtgcaactgg	ctccccctgc	cctacccaca	ccatcggccg	4620
	ccgrggageg	ttegegtegt	ctcgaacagg	aggcqqcaqq	tttqqcqaaq	togatgacca	4680
	rcgacacgcg	aggaactatg	acgaccaaga	agcgaaaaac	cqccqqcqaq	gacctggcaa	4740
4.0	aacaggtcag	cgaggccaag	caggccgcgt	tgctgaaaca	cacqaaqcaq	cagatcaagg	4800
40	aaatgcagct	ttccttqttc	gatattgcgc	cgtggccgga	cacqatqcqa	accetacces	4860
	acgacacggc	ccactctacc	ctqttcacca	cgcgcaacaa	caaaatcccc	gegaegeeaa	
	tocaaaacaa	ggtcattttc	cacotcaaca	aggacgtgaa	gadaaccccg	cgcgaggcgc	4920
	agctgcgggc	cgacgatgac	gaagtggtgt	ggcagcaggt	gattactac	acceggegteg	4980
	cccctatccc	caaaaaaata	gaactggtgt	ggcagcaggt	griggagtac	gcgaagcgca	5040
45	catcasta	ccactattac	accettcacge	tctacgagct	ttgccaggac	ctgggctggt	5100
. •	catacast	coggiaciac	acgaaggeeg	aggaatgcct	gtcgcgccta	caggcgacgg	5160
	taaaataat	cacguecgae	cgcgttgggc	acctggaatc	ggtgtcgctg	ctgcaccgct	5220
	teegegteet	ggaccgtggc	aagaaaacgt	cccgttgcca	ggtcctgatc	gacgaggaaa	5280
	regregreger	gtttgctggc	gaccactaca	cgaaattcat	atgggagaag	taccgcaagc	5340
EΩ	tgtegeegae	ggcccgacgg	atgttcgact	atttcagctc	gcaccqqqaq	ccqtacccqc	5400
50	teaagetgga	aaccttccgc	ctcatgtgcg	gatcggattc	cacccacata	aagaagtggc	5460
	gcgagcaggt	cggcgaagcc	tgcgaagagt	tgcgaggcag	caacctaata	gaacacgcct	5520
	gggtcaatga	tgacctggtg	cattgcaaac	gctagggcct	tatagaatca	attacaacta	5580
	ggggttcagc	agccagcgct	ttactqqcat	ttcaggaaca	agcagacact	actcaacaca	5640
	cttgcttcgc	tcagtatcgc	tegggaegea	cggcgcgctc	tacqaactcc	castasagaa	5700
55	aggattaaaa	ttgacaattg	tgattaaggg	tcagattcga	cacquactgc	cgataaacag	
	gcaggatttc	cacaagatee	gattgtcggc	catanaga	cggcttggag	cggccgaegt	5760
	catttacaa	caccaccaca	aaaaaaaa	cctgaagaaa	gerecagaga	tgttcgggtc	5820
	catagastta	accacataca	tagaggeedat	ggaggcgttc	yctgaacggt	tgcgagatgc	5880
	adacacacac	agogoccata	ccyacggcga	gatcattggg	ctgtcggtct	tcaaacagga	5940
60	agacagecee	aayyacyctc	acaaggcgca	tctgtccggc	gttttcgtgg	agcccgaaca	6000
55	gegaggeega	ggggtcgccg	gtatgctgct	gcgggcgttq	ccaacaaatt	tattqctcqt	6060
	gatgategte	cgacagattc	caacgggaat	ctggtqqatq	cqcatcttca	teeteaacac	6120
	acttaatatt	tcgctattct	ggagcttgtt	gtttatttcg	gtctaccgcc	taccaaacaa	6180
	ggtcgcggcg	acggtaggcg	ctgtgcagcc	gctgatggtc	gtgttcatct	ctgccgctct	6240

Hard Rose

122

P.

THE

ħ.

```
agaagaacat ttggaaggct gtcggtcgac taagttggca gcatcacccg aagaacattt 17640
      ggaaggctgt cggtcgacta caggtcacta ataccatcta agtagttgat tcatagtgac 17700
      tggatatgtt gtgttttaca gtattatgta gtctgttttt tatgcaaaat ctaatttaat 17760
      atattgatat ttatatcatt ttacgtttct cgttcagctt ttttgtacaa agttggcatt 17820
  5
      ataaaaaagc attgctcatc aatttgttgc aacgaacagg tcactatcag tcaaaataaa 17880
      atcattattt ggggcccgag atccatgcta gctctagagt cctgctttaa tgagatatgc 17940
      gagacgccta tgatcgcatg atatttgctt tcaattctgt tgtgcacgtt gtaaaaaacc
      tgagcatgtg tagctcagat ccttaccgcc ggtttcggtt cattctaatg aatatatcac
                                                                         18060
      cogttactat ogtattttta tgaataatat totoogttoa atttactgat tgtaccotac
                                                                         18120
      tacttatatg tacaatatta aaatgaaaac aatatattgt gctgaatagg tttatagcga
      catctatgat agagcgccac aataacaaac aattgcgttt tattattaca aatccaattt
      taaaaaaagc ggcagaaccg gtcaaaccta aaagactgat tacataaatc ttattcaaat
      ttcaaaaggc cccaggggct agtatctacg acacaccgag cggcgaacta ataacgttca
      ctgaagggaa ctccggttcc ccgccggcgc gcatgggtga gattccttga agttgagtat
                                                                         18420
 15
      tggccgtccg ctctaccgaa agttacgggc accattcaac ccggtccagc acggcggccg
                                                                         18480
      ggtaaccgac ttgctgcccc gagaattatg cagcattttt ttggtgtatg tgggccccaa
      atgaagtgca ggtcaaacct tgacagtgac gacaaatcgt tgggcgggtc cagggcgaat
      tttgcgacaa catgtcgagg ctcagcagga cctgcaggca tgcaagctag cttactagtg 18660
      atgcatattc tatagtgtca cctaaatctg c
                                                                         18691
20
      <210> 14
      <211> 59
      <212> DNA
25
      <213> Artificial sequence
      <220>
      <223>
            forward primer used for the amplification of 200 and 400 bp CHS ragments
30
      <400> 14
      ggggacaagt ttgtacaaaa aagcaggctg cactgctaac cctgagaacc atgtgcttc
                                                                            59
      <210> 15
35
      <211>
            59
      <212> DNA
      <213> Artificial sequence
      <220>
40
      <223>
            reverse primer for amplification of 400 bp CHS fragment
      <400> 15
     ggggaccact ttgtacaaga aagctgggtc gcttgacgga aggacggaga ccaagaagc
45
      <210>
            16
      <211>
            59
      <212> DNA
     <213> Artificial sequence
50
     <220>
     <223> reverse primer for amplification of 200bp CHS fragment
     <400> 16
55
     ggggaccact ttgtacaaga aagctgggta ggagccatgt aagcacacat gtgtgggtt
                                                                           59
     <210>
            17
     <211>
            100
60
     <212> DNA
     <213> Artificial sequence
```

þ.

'n.

πI

```
<220>
      <223>
             forward primer for amplification of 100bp CHS fragment
  5
      <400> 17
      ggggacaagt ttgtacaaaa aagcaggctg cactgctaac cctgagaacc atgtgcttca
                                                                            60
      ggcggagtat cctgactact acttccgcat caccaacagt
                                                                            100
 10
      <210>
             18
      <211>
             100
      <212>
             DNA
      <213> Artificial sequence
 15
      <220>
      <223> reverse primer for amplification of 100 bp CHS fragment
      <400> 18
20
      ggggaccact ttgtacaaga aagctgggta acttctcctt gaggtcggtc atgtgttcac
                                                                            60
      tgttggtgat gcggaagtag tagtcaggat actccgcctg
                                                                           100
      <210> 19
25
      <211> 79
      <212> DNA
      <213> Artificial sequence
      <220>
30
            forward primer for amplification of 50 bp CHS fragment
      <223>
      <400> 19
      ggggacaagt ttgtacaaaa aagcaggctg cactgctaac cctgagaacc atgtgcttca
                                                                            60
      ggcggagtat cctgactac
                                                                            79
35
      <210> 20
            79
      <211>
      <212> DNA
40
      <213> Artificial sequence
      <220>
     <223> reverse primer for 50 bp CHS fragment
45
      <400> 20
     ggggaccact ttgtacaaga aagctgggtg tagtcaggat actccgcctg aagcacatgg
                                                                            60
     ttctcagggt tagcagtgc
                                                                            79
50
     <210>
            21
     <211> 54
     <212> DNA
     <213> Artificial sequence
55
     <220>
     <223> forward primer for amplification of the 25 bp CHS fragment
     <400> 21
     ggggacaagt ttgtacaaaa aagcaggctg cactgctaac cctgagaacc atgt
                                                                           54
60
     <210> 22
     <211> 54
```

```
<212>
                 DNA
           <213>
                 Artificial sequence
           <220>
      5
           <223>
                 reverse primer for amplification of the 25 bp CHS fragment
           <400>
                 22
          ggggaccact ttgtacaaga aagctgggta catggttctc agggttagca gtgc
                                                                                  54
     10
           <210>
                 23
           <211>
                 17862
           <212>
                 DNA
           <213> Artificial sequence
     15
           <220>
          <223> acceptor vector pHELLSGATE4
          <400>
                 23
     20
          ggccgcacta gtgatatccc gcggccatgg cggccgggag catgcgacgt cgggcccaat
                                                                                 60
          tegecetata gtgagtegta ttacaattea etggeegteg ttttacaaeg tegtgaetgg
                                                                                120
          gaaaaccctg gcgttaccca acttaatcgc cttgcagcac atcccccttt cgccagctgg
                                                                                180
          cgtaatagcg aagaggcccg caccgatcgc ccttcccaac agttgcgcag cctgaatggc
240
          gaatggaaat tgtaaacgtt aatgggtttc tggagtttaa tgagctaagc acatacgtca
                                                                                300
    25
          gaaaccatta ttgcgcgttc aaaagtcgcc taaggtcact atcagctagc aaatatttct
                                                                                360
          tgtcaaaaat gctccactga cgttccataa attcccctcg gtatccaatt agagtctcat
                                                                                420
          attcactctc aatccaaata atctgcaatg gcaattacct tatccgcaac ttctttacct
                                                                                480
          atttccgccc ggatccgggc aggttctccg gccgcttggg tggagaggct attcggctat
                                                                                540
          gactgggcac aacagacaat cggctgctct gatgccgccg tgttccggct gtcagcgcag
                                                                                600
    30
          gggcgcccgg ttctttttgt caagaccgac ctgtccggtg ccctgaatga actgcaggac
                                                                                660
          gaggcagcgc ggctatcgtg gctggccacg acgggcgttc cttgcgcagc tgtgctcgac
                                                                                720
          gttgtcactg aagcgggaag ggactggctg ctattgggcg aagtgccggg gcaggatctc
780
          ctgtcatctc accttgctcc tgccgagaaa gtatccatca tggctgatgc aatgcggcgg
                                                                                840
          ctgcatacgc ttgatccggc tacctgccca ttcgaccacc aagcgaaaca tcgcatcgag
                                                                                900
    35
          cgagcacgta ctcggatgga agccggtctt gtcgatcagg atgatctgga cgaagagcat
                                                                                960
n.
          caggggctcg cgccagccga actgttcgcc aggctcaagg cgcgcatgcc cgacggcgag
                                                                               1020
U
          gatctcgtcg tgacccatgg cgatgcctgc ttgccgaata tcatggtgga aaatggccgc
                                                                               1080
          ttttctggat tcatcgactg tggccggctg ggtgtggcgg accgctatca ggacatagcg
1140
          ttggctaccc gtgatattgc tgaagagett ggcggcgaat gggctgaccg cttcctcgtg
                                                                               1200
πI
    40
          ctttacggta tcgccgctcc cgattcgcag cgcatcgcct tctatcgcct tcttgacgag
                                                                               1260
          ttettetgag egggaetetg gggttegaaa tgaeegaeca agegaegeee aacetgeeat
                                                                               1320
          cacgagattt cgattccacc gccgccttct atgaaaggtt gggcttcgga atcgttttcc
                                                                               1380
          gggacgccgg ctggatgatc ctccagcgcg gggatctcat gctggagttc ttcgcccacc
                                                                               1440
          ccgatccaac acttacgttt gcaacgtcca agagcaaata gaccacgaac gccggaaggt
                                                                               1500
    45
          tgccgcagcg tgtggattgc gtctcaattc tctcttgcag gaatgcaatg atgaatatga
                                                                               1560
          tactgactat gaaactttga gggaatactg cctagcaccg tcacctcata acgtgcatca
                                                                               1620
          tgcatgccct gacaacatgg aacatcgcta tttttctgaa gaattatgct cgttggagga
                                                                               1680
          tgtcgcggca attgcagcta ttgccaacat cgaactaccc ctcacgcatg cattcatcaa
                                                                               1740
         tattattcat gcggggaaag gcaagattaa tccaactggc aaatcatcca gcgtgattgg
                                                                               1800
    50
         taacttcagt tccagcgact tgattcgttt tggtgctacc cacgttttca ataaggacga
                                                                               1860
         gatggtggag taaagaagga gtgcgtcgaa gcagatcgtt caaacatttg gcaataaagt
                                                                               1920
         ttcttaagat tgaatcctgt tgccggtctt gcgatgatta tcatataatt tctgttgaat
                                                                               1980
         tacgttaagc atgtaataat taacatgtaa tgcatgacgt tatttatgag atgggtttt
                                                                               2040
         atgattagag tcccgcaatt atacatttaa tacgcgatag aaaacaaaat atagcgcgca
                                                                               2100
    55
         aactaggata aattatcgcg cgcggtgtca tctatgttac tagatcgaat taattccagg
                                                                               2160
         cggtgaaggg caatcagctg ttgcccgtct cactggtgaa aagaaaaacc accccagtac
                                                                              2220
         attaaaaacg tccgcaatgt gttattaagt tgtctaagcg tcaatttgtt tacaccacaa
                                                                              2280
         tatatectge caccagecag ceaacagete ecegacegge ageteggeae aaaateacea
                                                                              2340
         ctcgatacag gcagcccatc agtccgggac ggcgtcagcg ggagagccgt tgtaaggcgg
                                                                              2400
    60
         cagactttgc tcatgttacc gatgctattc ggaagaacgg caactaagct gccgggtttg
                                                                              2460
         aaacacggat gatctcgcgg agggtagcat gttgattgta acgatgacag agcgttgctg
                                                                              2520
         cctgtgatca aatatcatct ccctcgcaga gatccgaatt atcagccttc ttattcattt
                                                                              2580
         ctcgcttaac cgtgacaggc tgtcgatctt gagaactatg ccgacataat aggaaatcgc
```

e E

T.

	gaaaaacggg	cggaaaccct	: tgcaaatgct	ggattttctg	, cctgtggaca	gcccctcaaa	10260
	tgtcaatagg	tgcgcccctc	: atctgtcago	actetgeece	tcaagtgtca	aggatcgcgc	10320
	ccctcatctg	tcagtagtcg	g cgcccctcaa	. gtgtcaatac	cgcagggcac	: ttatccccag	10380
5	gcttgtccac	atcatctgtg	ggaaactcgc	gtaaaatcag	gcgttttcgc	cgatttgcga	10440
5	ggctggccag	ctccacgtcg	ccggccgaaa	. tcgagcctgc	ccctcatctg	tcaacgccgc	10500
	gccgggtgag	teggeceete	: aagtgtcaac	gtccgcccct	catctgtcag	tgagggccaa	10560
	gttttccgcg	aggtatccac	aacgccggcg	accaaccaca	gtgtctcgca	cacggcttcg	10620
	acggcgtttc	tggcgcgttt	gcagggccat	agacggccgc	cagcccagcg	gcgagggcaa	10680
10	ccagcccggt	gagcgtcgga	. aagggtcgac	atcttgctgc	gttcggatat	tttcgtggag	10740
10	ttcccgccac	agacccggat	tgaaggcgag	atccagcaac	tegegecaga	tcatcctgtg	10800
	acggaacttt	ggcgcgtgat	gactggccag	gacgtcggcc	gaaagagcga	caagcagatc	10860
	acgattttcg	acagcgtcgg	atttgcgatc	gaggatttt	cggcgctgcg	ctacgtccgc	10920
	gaccgcgttg	agggatcaag	ccacagcagc	ccactcgacc	ttctagccga	cccagacgag	10980
15	ccaagggatc	tttttggaat	getgeteegt	cgtcaggctt	tccgacgttt	gggtggttga	11040
13	acagaagtca	ttatcgtacg	gaatgccagc	actcccgagg	ggaaccctgt	ggttggcatg	11100
	cacatacaaa	tggacgaacg	gataaacctt	ttcacgccct	tttaaatatc	cgttattcta	11160
	ataaacgctc	ttttctctta	ggtttacccg	ccaatatatc	ctgtcaaaca	ctgatagttt	11220
	aaactgaagg	cgggaaacga	caatctgatc	atgagcggag	aattaaggga	gtcacgttat	11280
20	gacccccgcc	gatgacgcgg	gacaagccgt	tttacgtttg	gaactgacag	aaccgcaacg	11340
20	attgaaggag	ccactcagcc	ccaatacgca	aaccgcctct	ccccgcgcgt	tggccgattc	11400
	ttaatgcag	ctggcacgac	aggtttcccg	actggaaagc	gggcagtgag	cgcaacgcaa	11460
	ctaatgtgag	ttageteact	cattaggcac	cccaggcttt	acactttatg	cttccggctc	11520
	granginging	rggaartgtg	agcggataac	aatttcacac	aggaaacagc	tatgaccatg	11580
25	canactata	getatttagg	tgacactata	gaatactcaa	gctatgcatc	caacgcgttg	11640
20	aatctcacct	taagagaga	rgeaggegge	cgctcgacga	attaattcca	atcccacaaa	11700
	atatcaacta	ctaccaycaca	grigereete	tcagagcaga	atcgggtatt	caacaccctc	11760
	gtacaaagg	ccacgitgig	gagattagag	cacatgeegg	tatatacgat	gactggggtt	11820
	cagaggcaag	agcagcagct	gacgcctaca	gagitgeaca	caagaaattt	gccactatta	11880
30	tcatccccaa	aggagaaget	caactcaacc	caacaagtta	gcaaacagac tgctaaggcc	aggttgaact	11940
	caccaaaqca	aaaagcccac	taactcacac	taggageee	aaggcccagc	ctaacaagee	12000
	ccccaaaaqa	gatctccttt	accccaaaaa	ttacaatoca	cgatttcctc	tatatttaaa	12060
	atctaggaag	gaagttcgaa	gataaagata	acqacactat	gttcaccact	catactcacg	12120
	aggttagcct	cttcaatttc	agaaagaatg	ctgacccaca	gatggttaga	gataatyaya	12180 12240
35	cagcaggtct	catcaaqacq	atctacccga	gtaacaatct	ccaggagatc	agataccttc	12300
	ccaagaaggt	taaagatgca	gtcaaaagat	tcaggactaa	ttgcatcaag	aacacacaca	12360
	aagacatatt	tctcaagatc	agaagtacta	ttccagtatg	gacgattcaa	aacttacttc	12420
	ataaaccaag	gcaagtaata	gagattggag	tctctaaaaa	ggtagttcct	actgaatcta	12480
	aggccatgca	tggagtctaa	gattcaaatc	gaggatctaa	cagaactcgc	cataaaaact	12540
40	ggcgaacagt	tcatacagag	tcttttacga	ctcaatgaca	agaagaaaat	cttcqtcaac	12600
	atggtggagc	acgacactct	ggtctactcc	aaaaatgtca	aagatacagt	ctcagaagac	12660
	caaagggcta	ttgagacttt	tcaacaaagg	ataatttcgg	gaaacctcct	cogattccat	12720
	tgcccagcta	tctgtcactt	catcgaaagg	acagtagaaa	aggaaggtgg	ctcctacaaa	12780
A.E.	igicalcall	gcgataaagg	aaaggctatc	attcaaqatc	tetetaceaa	cagtggteee	12840
45	aaagatggac	ccccacccac	gaggagcatc	qtqqaaaaaq	aagacgttcc	aaccacqtct	12900
	tcaaagcaag	tggattgatg	tgacatctcc	actgacgtaa	gggatgacgc	acaatcccac	12960
	tatccttcgc	aagacccttc	ctctatataa	ggaagttcat	ttcatttgga	gaggacacgc	13020
	tcgaggctag	catggatete	gggccccaaa	taatgatttt	attttgactg	atagtgacct	13080
50	gttcgttgca	acaaattgat	gagcaatgct	tttttataat	gccaactttg	tacaaaaaag	13140
00	ctgaacgaga	aacgtaaaat	gatataaata	tcaatatatt	aaattagatt	ttgcataaaa	13200
	aacagactac	acaacaccgc	aaaacacaac	atatccagtc	actatgaatc	aactacttag	13260
	atggtattag	rgacctgtag	tcgaccgaca	gccttccaaa	tgttcttcgg	gtgatgctgc	13320
	caacttagtc	ttataataaa	trecaaatg	ttcttctcaa	acggaatcgt	cgtatccagc	13380
55	ctactcgcta	ttttatata	googtatta	aatcataaaa	agaaataaga	aaaagaggtg	13440
	cgagcctctt tagtcctgaa	aatcatctcc	atcaacaaca	acatotacot	actcatatac	gctagtgtca	13500
	agtcgttcgg	cttcatctcc	attttcaccc	totatactto	ctanacatt	tanactt	13560
	gtaatttcta	ctgtatcgag	ctocacacto	actatatatata	claaacgtga	caaagtttct	13620
	tccccagaac	atcaggttaa	taacat++++	gergryrara gatotoatt	agggagcctg	acatttatat	13680
60	cacttcttcc	ccqataacqq	adadcaacac	actorcosts	tegataataa	tastacase	13740
	gctttcatcc	ccgatatgca	CCaccagata	aagttcaccc	gagactttat	ctalageaca	13800
	acgtgcactg	gccaggggga	tcaccatcco	tcaccaaaac	gtgtcaataa	tatcactctc	13860 13920
	tacatccaca	aacagacqat	aacqqctctc	tottttatag	gtgtaaacct	taaactccat	13920
		- 2	22				T0700

	++ <2 < <2 > < + <						
	Gaggaatag	ttagtagt	g teageaaaag	agccgttcat	ttcaataaac	cgggcgacct	14040
	tataastaat	teccigate	teegetttee	agcgttcggc	acgcagacga	cgggcttcat	14100
	tergearggt	tgtgcttacc	agaccggaga	tattgacato	: atatatgcct	tgagcaactg	14160
5	atagetgtee	trateaacto	tcactgtaat	acgctgcttc	atagcacacc	tctttttgac	14220
0	acacticoggo	lagtgeegat	caacgtetea	ttttcgccaa	aagttggccc	agggcttccc	14280
	ggtattaata	gggacaccag	gatttattta	ttctgcgaag	, tgatetteeg	tcacaggtat	14340
	nantata	caaagtgcgt	cgggtgatgc	tgccaactta	ı gtcgactaca	ggtcactaat	14400
	accatetaag	tagttgattc	atagtgactg	gatatgttgt	gttttacagt:	attatgtagt	14460
10	cigittitta	tgcaaaatct	: aatttaatat	attgatattt	atatcatttt	acgtttctcg	14520
10	tteagettte	ttgtacaaag	, ttggcattat	aagaaagcat	tgcttatcaa	tttgttgcaa	14580
	cgaacaggto	actatcagto	: aaaataaaat	cattatttgc	catccagctg	cagctcctcg	14640
	aggaattcgg	taccccagct	: tggtaaggaa	. ataattattt	tctttttcc	ttttagtata	14700
	aaatagttaa	gtgatgttaa	ı ttagtatgat	tataataata	. tagttgttat	aattgtgaaa	14760
15	adataattta	taaatatatt	gtttacataa	acaacatagt	aatgtaaaaa	aatatgacaa	14820
13	gtgatgtgta	agacgaagaa	. gataaaagtt	gagagtaagt	atattattt	taatgaattt	14880
	gatcgaacat	gtaagatgat	atactagcat	taatatttgt	tttaatcata	atagtaattc	14940
	tagetggttt	gatgaattaa	. atatcaatga	taaaatacta	tagtaaaaat	aagaataaat	15000
	aaattaaaat	aatattttt	tatgattaat	agtttattat	ataattaaat	atctatacca	15060
20	ttactaaata	ttttagttta	aaagttaata	aatattttgt	tagaaattcc	aatctgcttg	15120
20	taatttatca	ataaacaaaa	tattaaataa	caagctaaag	taacaaataa	tatcaaacta	15180
	atagaaacag	taatctaatg	taacaaaaca	taatctaatg	ctaatataac	aaagcgcaag	15240
	atctatcatt	ttatatagta	ttattttcaa	tcaacattct	tattaatttc	taaataatac	15300
	ttgtagtttt	attaacttct	aaatggattg	actattaatt	aaatgaatta	gtcgaacatg	15360
25	aataaacaag	gtaacatgat	agatcatgtc	attgtgttat	cattgatctt	acatttggat	15420
20	tgattacagt	tgggaagetg	ggttcgaaat	cgataagctt	ggatcctcta	gagagctgca	15480
	getggatgge	aaataatgat	tttattttga	ctgatagtga	cctgttcgtt	gcaacaaatt	15540
	gataagcaat	gctttcttat	aatgccaact	ttgtacaaga	aagctgaacg	agaaacgtaa	15600
	aatgatataa	atatcaatat	attaaattag	attttgcata	aaaaacagac	tacataatac	15660
30	tgtaaaacac	aacatatcca	gtcactatga	atcaactact	tagatggtat	tagtgacctg	15720
30	cagtegaeta	agttggcagc	atcacccgac	gcactttgcg	ccgaataaat	acctgtgacg	15780
	gaagattatt	tegeagaata	aataaatcct	ggtgtccctg	ttgataccgg	gaagccctgg	15840
	tttatatta	ggcgaaaatg	agacgttgat	cggcactacc	catttcacaa	ctcttatact	15900
	atapartta	aagtegtteg	gcttcatctg	gattttcagc	ctctatactt	actaaacgtg	15960
35	araaagtttt	tgtaatttct	actgtatcga	cctgcagact	ggctgtgtat	aagggagcct	16020
00	gacatttata	tteeceagaa	catcaggtta	atggcgtttt	tgatgtcatt	ttcgcggtgg	16080
	atastagaga	ccacttette	cccgataacg	gagaccggca	cactggccat	atcggtggtc	16140
	tatasasasa	agettteate	cccgatatgc	accaccgggt	aaagttcacg	ggagacttta	16200
	atataaatat	gacgtgcact	ggccaggggg	atcaccatcc	gtcgcccggg	cgtgtcaata	16260
40	ttaaagtgg	gracarccac	aaacagacga	taacggctct	ctcttttata	ggtgtaaacc	16320
.0	ccaaactyca	taragenta	ccctgttctc	gtcagcaaaa	gagccgttca	tttcaataaa	16380
	accordetta	ttataatee	cttcctgatt	ttccgctttc	cagcgttcgg	cacgcagacg	16440
	ttgaggaagt	cataggatgg	ttgtgcttac	cagaccggag	atattgacat	catatatgcc	16500
	ctctttttca	gatagetgte	gctgtcaact	gtcactgtaa	tacgctgctt	catagcacac	16560
45	atatgastag	cacacttetty	ttcttgatgc	agatgatttt	caggactatg	acactagcgt	16620
	tratttcttt	ttatgateta	ttattttgtc	acacaaaaaa	gaggctcgca	cctcttttc	16680
	gattccgttt	gagagagaga	atacggcatt	gaggacaata	gcgagtaggc	tggatacgac	16740
	gaagaagatt	togaagaata	tttggaaggc	tgtcggtcga	ctaagttggc	agcatcaccc	16800
	ttcatactca	ctccatatat	tcggtcgact	acaggtcact	aataccatct	aagtagttga	16860
50	tctaatttaa	tatattoata	tgtgttttac	agtattatgt	agtotgtttt	ttatgcaaaa	16920
	aagttggcat	tataaaaaaa	tttatatcat	citacgitte	tcgttcagct	tttttgtaca	16980
	qtcaaaataa	aatcattatt	cattgctcat tggggcccga	caatttgttg	caacgaacag	gtcactatca	17040
	atgagatatg	caagacacct	atgatcgcat	gatecatget	agetetagag	tectgettta	17100
	totaaaaaaa	ctgaggatgt	gtagctcaga	taattaaaa	cccaattctg	ttgtgcacgt	17160
55	gaatatatca	cccattacta	tratatttt	atgaataata	ttataaatta	tcattctaat	17220
	ttgtacccta	ctacttatat	gtacaatatt	aaaatraaaa	dastatatte	aatttactga	17280
	gtttatagcg	acatctatoa	tagaggggga	Caataacaaa	Caatatatty	tgetgaatag	17340
	aaatccaatt	ttaaaaaaaa	Cadcadaacc	aatcaaaac	aaaacactee	ttaggtage	17400
	cttattcaaa	tttcaaaaaa	ccccadada	tantatota	aaaayactga	ccacacaat	17460
60	aataacgttc	actgaagga	actccggttc	cagaaccaaca	cacacaccya	geggegaact	17520
	aagttgagta	ttagccat.cc	gctctaccoa	aagttaccc	caccatton	agactecttg	17580
	cacggcggcc	gggtaaccga	cttactacca	caacaattat	ggaggattt	tttaatatat	17640
	gtgggcccca	aatgaagtgc	aggtcaaacc	ttgacagtga	coacaaatco	ttagagaget	17700
	·	5 5-53	55-554400	Jucuyuya	ogucaaatcy	rrgggcgggt	17760

of the Mark 1983 of Michigan was made as an endergoing the art of the Mark 1988 of the Art of the A

	ccaacccaac	. caggggtgat	· aataaaaa		1 -1 1 1		
	ccaagccaac	taggggugal	gergeeaact	tactgattta	a gtgtatgatg	gtgtttttga	3060
	ggrgereeag	r cggettetgt	Licetateage	tgteceteet	t gttcagctac	tgacggggtg	3120
	grgegraaeg	gcaaaagcac	cgccggacat	cagogotato	c tctgctctca	ctgccgtaaa	3180
5	acatggcaac	tgcagttcac	ttacaccgct	teteaacee	g gtacgcacca	gaaaatcatt	3240
5	gatatggcca	tgaatggcgt	: tggatgccgg	gcaacagcco	c gcattatggg	cgttggcctc	3300
	aacacgattt	tacgtcactt	: aaaaaactca	ggccgcagto	ggtaacctcq	cqcatacaqc	3360
	cgggcagtga	cgtcatcgtc	: tgcgcggaaa	tggacqaaca	a gtggggctat	gtcggggcta	3420
	aatcgcgcca	gcgctggctg	r ttttacgcgt	: atgacagtct	ccggaaqacq	gttattacac	3480
4.0	acgtattcgg	tgaacgcact	atggcgacgc	: tggggcgtct	tatgagcctg	ctotcaccct	3540
10	ttgacgtggt	gatatggatg	acggatggct	gaccactata	tgaatcccgc	ctgaagggaa	3600
	agctgcacgt	aatcagcaag	cgatatacqc	: agcgaattga	geggeataac	ctgaatctga	3660
	ggcagcacct	ggcacggcto	ggacggaagt	cactateatt	ctcaaaatcg	atagaactac	3720
	atgacaaagt	catcgggcat	tatctgaaca	taaaacacta	tcaataagtt	gagagagaga	3780
	cccaaccaqq	aaqqqcaqcc	cacctatcaa	gatatactac	cttccagacg	aaccaacca	3840
15	gattgaggaa	aaggcggcgg	caaccaacat	gagetete	gcctacctgc	tagagataga	
	ccagggctac	aaaatcacco	acatcatcae	gageeegeeg	gtccgcgagc	tggccgtcgg	3900
	caatoocoac	ctaggecaeg	tagaaaaa	gatassaata	greegegage	tggcccgcat	3960
	cacaacacaa	ttcactcata	agagagatagt	gergaaaere	tggctcaccg	acgacccgcg	4020
	caeggegegg	gagagatg	teatgateet	cgccctgctg	gcgaagatcg	aagagaagca	4080
20	ttaggggtt	ggcaaggtca	tgatgggcgt	ggtccgcccg	agggcagagc	catgactttt	4140
20	tragecycla	aaacggccgg	ggggtgcgcg	tgattgccaa	gcacgtcccc	atgcgctcca	4200
	ccaagaagag	cgacttcgcg	gagetggtat	tcgtgcaggg	caagattcgg	aataccaagt	4260
	acgagaagga	cggccagacg	gtctacggga	ccgacttcat	tgccgataag	gtggattatc	4320
	tggacaccaa	ggcaccaggc	gggtcaaatc	aggaataagg	gcacattgcc	ccggcgtgag	4380
25	teggggeaat	cccgcaagga	gggtgaatga	atcggacgtt	tgaccggaag	gcatacaggc	4440
25	aagaactgat	cgacgcgggg	ttttccgccg	aggatgccga	aaccatcqca	agccgcaccg	4500
	tcatgcgtgc	gccccgcgaa	accttccagt	ccgtcggctc	gatggtccag	caaqctacqq	4560
	ccaagatcga	gcgcgacagc	gtgcaactgg	ctccccctqc	cctacccaca	ccatcggccg	4620
	ccgrggagcg	ttcgcgtcgt	ctcgaacagg	aggcggcagg	tttqqcqaaq	tcgatgacca	4680
00	Legacaegeg	aggaactatg	acgaccaaqa	aqcqaaaaac	caccaacaaa	gacctggcaa	4740
30	aacaggtcag	cgaggccaag	caggccgcgt	tgctgaaaca	cacgaagcag	cagatcaagg	4800
	aaatgcagct	ttccttgttc	gatattqcqc	cataaccaaa	cacgatgcga	acaataccaa	4860
	acgacacggc	ccgctctgcc	ctqttcacca	cgcgcaacaa	gaaaatcccg	Gagaggeaa	4920
	tgcaaaacaa	ggtcattttc	cacqtcaaca	aggacgtgaa	gatcacctac	acconcator	4980
	agctgcgggc	cgacgatgac	gaactggtgt	adcadcadat	gttggagtac	accagacaca	5040
35	cccctatcgg	cgaqccgatc	accttcacqt	tctacgaget	ttgccaggac	ctagagtgca	5100
	cgatcaatqq	ccqqtattac	acgaaggccg	aggaatgcct	gtcgcgccta	cagggerggr	
	cqatqqqctt	cacqtccqac	cacattagac	acctocaato	ggtgtcgctg	caggegaegg	5160
	tccacatcct	ggaccgtggc	aagaaaacgt	cccattaga	ggtcctgatc	ctgcaceget	5220
	tcatcatact	atttactac	caccactaca	cccgttgcca	ggteetgate	gacgaggaaa	5280
40	tatcaccaac	accccascac	atattagagt	cyaaatttat	atgggagaag	taccgcaagc	5340
	traagrigge	aaccttcccc	atgetegace	attedagete	gcaccgggag	ccgtacccgc	5400
	acaaacaaat	Cooccasacac	tagasage	gateggatte	cacccgcgtg	aagaagtggc	5460
	gegageagge	tgagggaagee	tgcgaagagt	tgcgaggcag	cggcctggtg	gaacacgcct	5520
	gggccaatga	aggagagaga	cattgcaaac	gctagggcct	tgtggggtca	gttccggctg	5580
45	ggggtteage	agecageget	ttactggcat	ttcaggaaca	agcgggcact	gctcgacgca	5640
70	catgettege	teagtatege	tegggaegea	cggcgcgctc	tacgaactgc	cgataaacag	5700
	aggattaaaa	ttgacaattg	tgattaaggc	tcagattcga	cggcttggag	cggccgacgt	5760
	geaggattte	cgcgagatcc	gattgtcggc	cctqaaqaaa	qctccaqaqa	tattcaaatc	5820
	cgtttacgag	cacgaggaga	aaaagcccat	ggaggcgttc	gctgaacggt	tacaagatac	5880
EΟ	egrggearre	ggcgcctaca	tcgacggcga	gatcattggg	ctatcaatct	tcaaacagga	5940
50	ggacggcccc	aaggacgctc	acaaggcgca	tctgtccggc	attttcataa	agecegaaca	6000
	gcgaggccga	ggggtcgccg	gtatgctgct	gcgggcqttq	ccaacaaatt	tattgctcgt	6060
	gargarcgre	cgacagattc	caacgggaat	ctqqtqqatq	cgcatcttca	tecteggege	6120
	acttaatatt	tcgctattct	ggagcttgtt	qtttatttcq	gtctaccgcc	taccaaacaa	6180
	ggtcgcggcg	acggtaggcg	ctgtgcagcc	actaataata	gtgttcatct	ctaccactet	6240
55	gctaggtagc	ccgatacgat	tgatggcggt	cctagagact	atttqcqqaa	ctacagacat	6300
	ggcgctgttg	gtgttgacac	caaacgcagc	actagatect	atcaccatca	cagoggggg	6360
	ggcgggggg	gtttccatgg	cattcagaac	catactaacc	cccaactoo	agegggeet	
	gcctctgctc	acctttaccg	cctoccaact	accacacaca	cgcaagtgge	aacctcccgt	6420
	agctttagtg	tttgatccoc	caatccccat	gcctacacca	aggattatta	tagaaataa	6480
60	gtageteaar	ctgatcggag	caaatttaaa	ctacttactt	tacttacte	Leggedtgge	6540
-	gtggctcggc	acadttott+	ccttactcc	ctacttcctt	Lygeteeggg	ggatetegeg	6600
	actogaacct	atottoatat	accetating	ottocccage	cgggatggcg	ctaagaagct	6660
	attgccgccg a	actottacac	ttaataa	acaccgcaca	gatgcgtaag	gagaaaatac	6720
	cgcatcaggc	getettedge	recetegete	actgactcgc	tgcgctcggt	cgttcggctg	6780

TGGGGGGGGGGG

	caacaaacaa	tatcacctc	e ctannaca	· ~+~~+~~~			
	aacgcaggag	aceageee	a cucaaaggu	g glaatacgg	Latecacaga	atcaggggat	6840
	acattactaa	cottttta	aycaaaayy	caycaaaagg	g ccaggaaccg	taaaaaggcc	6900
	tcaactcaca	getagagaaa	a caggereege	ceeeetgaeg	agcatcacaa	aaatcgacgc	6960
5	acctccctcc	tagaatata	tottagasas	. Clataaagat	accaggcgtt	: tccccctgga	
Ů	ctcccttccc	caegetee	a catterna	ctgeegetta	ccggatacct	gtccgccttt	7080
	taggtggttg	gaagegegege	gerriera	tgeteaeget	gtaggtatct	: cagttcggtg	
	cagginging	geteeaaget	gggctgtgtg	g cacgaacccc	cegtteaged	cgaccgctgc	7200
	geettateeg	gtaactateg	terrgagted	: aacccggtaa	ı gacacgactt	atcgccactg	7260
10	geageageea	ctggtaacag	gattagcaga	gcgaggtate	, taggcggtgc	: tacagagttc	7320
10	rtgaagtggt	ggcctaacta	cggctacact	agaaggacag	, tatttggtat	ctgcgctctg	7380
	ctgaagccag	ttaccttcgg	, aaaaagagtt	ggtagctctt	gatccggcaa	acaaaccacc	7440
	gctggtagcg	gtggttttt	: tgtttgcaag	r cagcagatta	cgcgcagaaa	aaaaggatat	7500
	caagaagatc	ctttgatctt	: ttctacgggg	tetgaegete	: agtggaacga	aaactcacgt	7560
15	taagggattt	tggtcatgag	, attatcaaaa	aggatcttca	cctagatcct	tttaaattaa	7620
10	aaatgaagtt	ttaaatcaat	: ctaaagtata	. tatgagtaaa	. cttggtctga	cagttaccaa	7680
	tgcttaatca	gtgaggcacc	: tatctcagcg	atctgtctat	ttcgttcatc	cataqttqcc	7740
	tgactccccg	tcgtgtagat	: aactacgata	cgggagggct	taccatctqq	ccccaqtqct	7800
	gcaatgatac	cgcgagaccc	: acgctcaccg	gctccagatt	tatcaqcaat	aaaccaqcca	7860
00	gccggaaggg	ccgagcgcag	, aagtggtcct	gcaactttat	ccqcctccat	ccaqtctatt	7920
20	aaacaagtgg	cagcaacgga	. ttcgcaaacc	tgtcacgcct	tttgtgccaa	aagccgcgcc	7980
	aggtttgcga	tccgctgtgc	: caggcgttag	gcgtcatatg	aagatttcqq	tgatccctga	8040
	gcaggtggcg	gaaacattgg	atgctgagaa	ccatttcatt	gttcgtgaag	tattcaatat	8100
	gcacctatcc	gaccaaggct	ttgaactatc	taccaqaaqt	gtgagcccct	accogaagga	8160
0.5	ttacatctcg	gatgatgact	ctgatgaaga	ctctgcttqc	tatqqcqcat	tcatcgacca	8220
25	agagcttgtc	gggaagattg	aactcaactc	aacatggaac	gatctagcct	ctatcgaaca	8280
	cattgttgtg	tcgcacacgc	accgaggcaa	aggagtcgcg	cacaqtctca	tcgaatttgc	8340
	gaaaaagtgg	gcactaagca	gacagctcct	tggcatacga	ttagagacac	aaacgaacaa	8400
	tgtacctgcc	tgcaatttgt	acgcaaaatq	tggctttact	ctcggcggca	ttgacctgtt	8460
	cacgtataaa	actagacctc	aagtctcgaa	cgaaacagcg	atgtactggt	actggttctc	8520
30	gggagcacag	gatgacgcct	aacaattcat	tcaaqccqac	accgcttcgc	aacacaactt	8580
	aattcaggag	ttaaacatca	tgagggaagc	ggtgatcgcc	gaagtatcga	ctcaactatc	8640
	agaggtagtt	ggcgtcatcg	agcqccatct	cgaaccgacg	ttgctggccg	tacatttota	8700
	cggctccgca	gtggatggcg	gcctgaagcc	acacagtgat	attgatttgc	taattacaat	8760
_	gaccgtaagg	cttgatgaaa	caacqcqqcq	agetttgate	aacgaccttt	togazactto	8820
35	ggcttcccct	ggagagagcg	agatteteeg	cactatagaa	gtcaccattg	ttatacaaaa	8880
	cgacatcatt	ccatagcatt	atccacctaa	acacaaacta	caatttggag	aatoggaacga	
	caatgacatt	cttqcaqqta	tcttcgagcc	agccacgatc	gacattgatc	taggtatet	8940 9000
	gctgacaaaa	qcaaqaqaac	atagcattac	cttagtaggt	ccagcggcgg	aggazatatt	9060
	tgatccqqtt	cctgaacagg	atctatttga	accactagat	gaaaccttaa	aggaactett	
40	ctcgccqccc	qactqqqctq	gcgatgagcg	aaatotaoto	cttacgttgt	agaggattta	9120
	gtacagcgca	gtaaccggca	aaatcgcgcc	gaaggatgtc	gctgccgact	aggastage	9180
	gcqcctqccq	gcccagtatc	agcccgtcat	acttgaaget	aggcaggctt	gggcaatgga	9240
	agaaqatcqc	ttaacctcac	gcgcagatica	attanaget	tttgttcact	acctiggaca	9300
	cgagatcacc	aaggtagtcg	gcaaataatg	tctaacaatt	cgttcaagcc	acgregatage	9360
45	cacaacacaa	cttaactcaa	gcattagaga	actagagaaa	actatgcgcg	gacgeegett	9420
	ggtggttcta	agcctcgtac	ttgcgatggc	atcoggggaag	accatgegeg	accigitgaa	9480
	tattttaata	gatgaagete	atcttcccta	tractactor	ccatccaact	acctgccaat	9540
	tccaagcaac	tacgacaact	CCataaccaa	ttaggagaat	agtccatcaa	acgacatttc	9600
	ctctgagagc	aactacqata	atacttcatc	caattagaaa	agtocatcaa	attacgacaa	9660
50	ctctgagagc taggcttata	tatagegeaa	atagatata	caattacyac	aatagtegea	acggaaatcg	9720
	caatgggaca	acqaacttct	tttccacatc	tagganana	ggetactacg	tcattgccaa	9780
	ggggcgcggc	atctatacca	ccacacacc	ggcaaaagg	argreetaca	ccccaaaagg	9840
	tggccaattt	tracttarca	taacacataa	gagettetge	ggggcattgg	tegteataaa	9900
	tggccaattt	taataaaato	ttaggacaa	cggcccgaag	accatgtate	taagcaacta	9960
55	gcctgctctc ggccgagggg	cacaacacat	agaggasta:	ggccgccatt	truggggtga	ygccgttcgc	10020
_	ggccgagggg gagaagggg	-3cageceee	ttccccctcc	gaggeeege	ccayegggee	gggagggttc	10080
	gagaaggggg	tttataaato	ttagtttage	goggreacge	yedaggggg	agccctggtt	10140
	aaaaacaagg gaaaaacaag	COGRARACCO	tagaaataat	agcaygttaa	aagacaggtt	agcggtggcc	10200
	gaaaaacggg tgtcaatagg	tacaccacta	atatatasa=	gyactttctg	cctgtggaca	gcccctcaaa	10260
60	tgtcaatagg ccctcatctg	tcagtagtcc	caccatass	actuigecee	ccaagtgtca	aggategege	10320
	ccctcatctg	atcatctctc	ggaaagtgaa	grantac	cgcagggcac	ttatccccag	10380
	gcttgtccac	ctccacctgcg	ggaaactcgc	yuaaaatcag	gcgttttcgc	cgatttgcga	10440
	ggctggccag	traggrage	aagtataaaa	regageetge	ccctcatctg	tcaacgccgc	10500
	gccgggtgag		aaytgtcaac	gradgedeet	catctgtcag	tgagggccaa	10560

	atttaaaa						
	gtttteegeg	aggtatecac	: aacgccggcg	i geeggeegeg	g gtgtctcgca	cacggcttcg	10620
	acggcgtttc	: tggcgcgttt	gcagggccat	agacggccgc	cageceage	gcgagggcaa	10680
	ccagcccggt	gagcgtcgga	. aagggtcgac	: atcttgctgc	gttcggatat	tttcgtggag	10740
_	ttcccgccac	agacccggat	tgaaggcgag	atccagcaac	tcgcgccaga	tcatcctgtg	10800
5	acggaacttt	ggcgcgtgat	gactggccag	gacgtcggcc	gaaaqaqcqa	caagcagatc	10860
	acgattttcg	acagcgtcgg	atttgcgatc	gaggatttt	caacactaca	ctacgtccgc	10920
	gaccgcgttg	agggatcaag	ccacaqcaqc	ccactcgacc	ttctagccga	cccagacgag	10980
	ccaagggatc	tttttggaat	actactacat	catcagactt	tccaacattt	gggtggttga	11040
	acagaagtca	ttatcgtacg	gaatgccagc	acteeggace	r ccaaccatat	ggttggcatg	11100
10	cacatacaaa	tagacgaacg	gataaacctt	ttcaccccacct	tttaaatata	cgttattcta	
	ataaacoctc	ttttctctt	gattaaacccc	ggaatatata	. ctcaaacacc	cyclaticia	11160
	asaataaaa	ggggggggg	ggtttacccg	CCaatatatC	ctgtcaaaca	ctgatagttt	11220
	aaactgaagg	cgggaaacga	Caaletgate	atgagcggag	r aattaaggga	gtcacgttat	11280
	gacccccgcc	gatgacgcgg	gacaagccgt	tttacgtttg	gaactgacag	aaccgcaacg	11340
15	accgaaggag	ccactcagcc	ccaatacgca	aaccgcctct	ccccgcgcgt	tggccgattc	11400
15	attaatgcag	ctggcacgac	aggtttcccg	actggaaagc	gggcagtgag	cgcaacgcaa	11460
	ttaatgtgag	ttagctcact	cattaggcac	cccaggcttt	acactttatg	cttccggctc	11520
	gtatgttgtg	tggaattgtg	agcggataac	aatttcacac	aggaaacagc	tatgaccatg	11580
	attacgccaa	gctatttagg	tgacactata	qaatactcaa	gctatgcatc	caacgcgttg	11640
	ggagctctcc	catatcgacc	tqcaqqcqqc	cactcaacaa	attaattcca	atcccacaaa	11700
20	aatctgagct	taacagcaca	attactcctc	tcagagcaga	atcocctatt	caacaccctc	11760
	atatcaacta	ctacattata	tataacqqtc	cacatoccoo	tatatacgat	gactggggtt	11820
	gtacaaaggc	ggcaacaaac	gacattaca	gagttggg	caecaegae	gccactatta	11880
	Cagagggaag	agcagcagct	gacacataca	caacaactca	gcaaacagac	gecactatta	
	tratrorcas	aggaggagge	gaegegeaca	caacaagtta	gcaaacagac	aggrigaact	11940
25	Caccaaacca	aggagaagee	taactcaage	ccaagagett	tgctaaggcc	ctaacaagcc	12000
	gaggaaaagca	adaayeeeae	tggeteaege	taggaaccaa	aaggcccagc	agtgatccag	12060
	ccccaaaaga	gateteettt	gccccggaga	ttacaatgga	cgatttcctc	tatctttacg	12120
	atctaggaag	gaagttcgaa	ggtgaaggtg	acgacactat	gttcaccact	gataatgaga	12180
	aggttagcct	cttcaatttc	agaaagaatg	ctgacccaca	gatggttaga	gaggcctacg	12240
20	cagcaggtct	catcaagacg	atctacccga	gtaacaatct	ccaggagatc	aaataccttc	12300
30	ccaagaaggt	taaagatgca	gtcaaaagat	tcaggactaa	ttqcatcaaq	aacacagaga	12360
	aagacatatt	tctcaagatc	agaagtacta	ttccagtatq	qacqattcaa	gacttacttc	12420
	ataaaccaag	gcaagtaata	gagattggag	tctctaaaaa	ggtagttcct	actgaatcta	12480
	aggccatgca	tggagtctaa	gattcaaatc	gaggatctaa	cagaactcgc	cataaaaact	12540
	ggcgaacagt	tcatacagag	tcttttacqa	ctcaatgaca	agaagaaaat	cttcqtcaac	12600
35	atggtggagc	acgacactct	ggtctactcc	aaaaatgtca	aagatacagt	ctcagaagac	12660
	caaagggcta	ttgagacttt	tcaacaaagg	ataatttcgg	gaaacctcct	cocattccat	12720
	tgcccagcta	tctqtcactt	catcgaaagg	acagtagaaa	aggaaggtgg	ctcctacaaa	12780
	tgccatcatt	gcgataaagg	aaaggctatc	attcaacatc	tctctgccga	gagtagtaga	
	aaagatggac	CCCCacccac	gaggaggate	ataaaaaaa	aagacgttcc	caguggueee	12840
40	tcaaagcaag	tagattgata	taggageace	graygaaaaag	aayacgttcc	aaccacgtet	12900
	tateetteee	aggactgatg	gacatetee	actgacgtaa	gggatgacgc	acaatcccac	12960
	taracacac	tttatagae	Cicialalaa	ggaagttcat	ttcatttgga	gaggacacgc	13020
	tattaaatta	citytacaaa	aaagetgaae	gagaaacgta	aaatgatata	aatatcaata	13080
	cattaaatta	gattitigeat	aaaaaacaga	ctacataata	ctgtaaaaca	caacatatcc	13140
45	agreactarg	aatcaactac	ttagatggta	ttagtgacct	gtagtcgacc	gacagccttc	13200
70	caaatgttct	tcgggtgatg	ctgccaactt	agtcgaccga	cagcetteca	aatgttcttc	13260
	tcaaacggaa	tegtegtate	cagcctactc	gctattgtcc	tcaatgccgt	attaaatcat	13320
	aaaaagaaat	aagaaaaaga	ggtgcgagcc	tcttttttgt	gtgacaaaat	aaaaacatct	13380
	acctattcat	atacgctagt	gtcatagtcc	tgaaaatcat	ctgcatcaag	aacaatttca	13440
E0	caactcttat	acttttctct	tacaagtcgt	tcggcttcat	ctqqattttc	agcctctata	13500
50	cttactaaac	gtgataaagt	ttctgtaatt	tctactqtat	cgacctgcag	actggctgtg	13560
	tataagggag	cctgacattt	atattcccca	gaacatcagg	ttaatggcgt	ttttgatgtc	13620
	attttcgcgg	tggctgagat	cagccacttc	ttccccqata	acqqaqaccq	gcacactggc	13680
	catatcggtg	gtcatcatqc	qccaqctttc	atccccgata	tgcaccaccg	ggtaaagttc	13740
	acgggagact	ttatctqaca	gcagacgtgc	actggccagg	gggatcacca	tecateacee	13800
55	gggcgtgtca	ataatatcac	tctgtacatc	cacaaacaca	cgataacggc	tatatattt	
	ataggtgtaa	accttaaact	gcatttcacc	agtccctatt	ctcgtcagca	2220200000	13860
	tcatttcaat	aaaccgggcg	acctcaccca	tecetteete	attttccgct	adagageege	13920
	Caacacacac	acdacdddct	tcattctcc	tagttatast	taccagaccg	receageget	13980
	catcatatat	accttcacca	actostsoct	chacater :	caccagaccg	yagatattga	14040
60	cttcatacca	cacctcttt	tarantart	gregetgtea	actgtcactg	taatacgctg	14100
	cttcatagca	agggaggagg	tagaartet	cyggtagtgc	cgatcaacgt	ctcattttcg	14160
	caudagety	taataa ==	coccegetate	aacagggaca	ccaggattta	tttattctgc	14220
	gaagtgatct	tagacat	yeartratto	ygcgcaaagt	gcgtcgggtg	atgctgccaa	14280
	cttagtcgac	Lacaggtcac	taataccatc	taagtagttg	attcatagtg	actggatatg	14340

```
ttgtgtttta cagtattatg tagtctgttt tttatgcaaa atctaattta atatattgat 14400
      atttatatca ttttacgttt ctcgttcagc tttcttgtac aaagtggtct cgaggaattc 14460
      ggtaccccag cttggtaagg aaataattat tttctttttt ccttttagta taaaatagtt
      aagtgatgtt aattagtatg attataataa tatagttgtt ataattgtga aaaaataatt
 5
      tataaatata ttgtttacat aaacaacata gtaatgtaaa aaaatatgac aagtgatgtg
      taagacgaag aagataaaag ttgagagtaa gtatattatt tttaatgaat ttgatcgaac
      atgtaagatg atatactagc attaatattt gttttaatca taatagtaat tctagctggt
      ttgatgaatt aaatatcaat gataaaatac tatagtaaaa ataagaataa ataaattaaa
      ataatatttt tttatgatta atagtttatt atataattaa atatctatac cattactaaa
10
      tattttagtt taaaagttaa taaatatttt gttagaaatt ccaatctgct tgtaatttat
      caataaacaa aatattaaat aacaagctaa agtaacaaat aatatcaaac taatagaaac
      agtaatctaa tgtaacaaaa cataatctaa tgctaatata acaaagcgca agatctatca
                                                                         15060
      ttttatatag tattattttc aatcaacatt cttattaatt tctaaataat acttgtagtt
                                                                         15120
      ttattaactt ctaaatggat tgactattaa ttaaatgaat tagtcgaaca tgaataaaca
                                                                         15180
15
      aggtaacatg atagatcatg tcattgtgtt atcattgatc ttacatttgg attgattaca
      gttgggaagc tgggttcgaa atcgataagc ttggatcctc tagaccactt tgtacaagaa
      agctgaacga gaaacgtaaa atgatataaa tatcaatata ttaaattaga ttttgcataa
      aaaacagact acataatact gtaaaacaca acatatccag tcactatgaa tcaactactt
      agatggtatt agtgacctgt agtcgactaa gttggcagca tcacccgacg cactttgcgc
20
      cgaataaata cctgtgacgg aagatcactt cgcagaataa ataaatcctg gtgtccctgt
      tgataccggg aagccctggg ccaacttttg gcgaaaatga gacgttgatc ggatttcaca
      actettatac ttttetetta caagtegtte ggetteatet ggatttteag cetetatact
      tactaaacgt gataaagttt ctgtaatttc tactgtatcg acctgcagac tggctgtgta
                                                                         15720
      taagggagcc tgacatttat attccccaga acatcaggtt aatggcgttt ttgatgtcat
                                                                         15780
25
      tttcgcggtg gctgagatca gccacttctt ccccgataac ggagaccggc acactggcca
      tatcggtggt catcatgcgc cagctttcat ccccgatatg caccaccggg taaagttcac
      gggagacttt atctgacagc agacgtgcac tggccagggg gatcaccatc cgtcgcccgg
                                                                         15960
     gcgtgtcaat aatatcactc tgtacatcca caaacagacg ataacggctc tctctttat
                                                                         16020
     aggtgtaaac cttaaactgc atttcaccag tccctgttct cgtcagcaaa agagccgttc
                                                                         16080
30
     atttcaataa accgggcgac ctcagccatc ccttcctgat tttccgcttt ccagcgttcg
                                                                        16140
     gcacgcagac gacgggcttc attctgcatg gttgtgctta ccagaccgga gatattgaca
     tcatatatgc cttgagcaac tgatagctgt cgctgtcaac tgtcactgta atacgctgct 16260
     tcatagcaca cctctttttg acatacttct gttcttgatg cagatgattt tcaggactat 16320
     gacactagcg tatatgaata ggtagatgtt tttattttgt cacacaaaaa agaggctcgc 16380
35
     acctcttttt cttatttctt tttatgattt aatacggcat tgaggacaat agcgagtagg 16440
     ctggatacga cgattccgtt tgagaagaac atttggaagg ctgtcggtcg actaagttgg 16500
     cagcatcacc cgaagaacat ttggaaggct gtcggtcgac tacaggtcac taataccatc 16560
     taagtagttg attcatagtg actggatatg ttgtgtttta cagtattatg tagtctgttt 16620
     tttatgcaaa atctaattta atatattgat atttatatca ttttacgttt ctcgttcagc
40
     ttttttgtac aaacttgtct agagtcctgc tttaatgaga tatgcgagac gcctatgatc
     gcatgatatt tgctttcaat tctgttgtgc acgttgtaaa aaacctgagc atgtgtagct
     cagateetta eegeeggttt eggtteatte taatgaatat ateaecegtt actategtat
     ttttatgaat aatattctcc gttcaattta ctgattgtac cctactactt atatgtacaa
     tattaaaatg aaaacaatat attgtgctga ataggtttat agcgacatct atgatagagc
45
     gccacaataa caaacaattg cgttttatta ttacaaatcc aattttaaaa aaagcggcag
                                                                        17040
     aaccggtcaa acctaaaaga ctgattacat aaatcttatt caaatttcaa aaggccccaq
                                                                        17100
     gggctagtat ctacgacaca ccgagcggcg aactaataac gttcactgaa gggaactccg
                                                                        17160
     gttccccgcc ggcgcgcatg ggtgagattc cttgaagttg agtattggcc gtccgctcta
     ccgaaagtta cgggcaccat tcaacccggt ccagcacggc ggccgggtaa ccgacttgct
50
     gccccgagaa ttatgcagca tttttttggt gtatgtgggc cccaaatgaa gtgcaggtca
                                                                        17340
     aacettgaca gtgacgacaa atcgttgggc gggtccaggg cgaattttgc gacaacatgt 17400
     cgaggctcag caggacctgc aggcatgcaa gctagcttac tagtgatgca tattctatag
                                                                       17460
     tgtcacctaa atctgc
                                                                         17476
55
     <210>
            25
     <211>
            17458
     <212>
           DNA
     <213> Artificial sequence
60
     <220>
     <223> acceptor vector pHELLSGATE11
```

DE PROMINISTRA NI MINISTRA NI MINI

H

	100 05						
	<400> 25	ataststaca	acaacaataa	caacaaaaa	catacaacat	agagagaaat	60
					catgcgacgt ttttacaacg		120
					atcccccttt		180
5					agttgcgcag		240
					tgagctaagc		300
					atcagctagc		360
					gtatccaatt		420
					tatccgcaac		480
10					tggagaggct		540
					tgttccggct		600
					ccctgaatga		660
	gaggcagcgc	ggctatcgtg	gctggccacg	acgggcgttc	cttgcgcagc	tgtgctcgac	720
4-					aagtgccggg		780
15					tggctgatgc		840
					aagcgaaaca		900
	cgagcacgta	ctcggatgga	agccggtctt	gtcgatcagg	atgatctgga	cgaagagcat	960
	caggggctcg	cgccagccga	actgttcgcc	aggctcaagg	cgcgcatgcc	cgacggcgag	1020
20					tcatggtgga		1080
20	ttttctggat	tcatcgactg	tggccggctg	ggtgtggcgg	accgctatca	ggacatagcg	1140
	ttggctaccc	gtgatattgc	tgaagagett	ggcggcgaat	gggctgaccg	cttcctcgtg	1200
					tctatcgcct		1260
					agcgacgccc		1320
25	ggaggggggg	ctccatcatc	geegeettet	acgadaggit	gggcttcgga	ategttttee	1380
20					gctggagttc		1440 1500
	taccacaaca	tataaattac	gtctcaattc	tetetteea	gaccacgaac gaatgcaatg	atgaatatga	1560
	tactgactat	gaaactttga	gggaatactg	cctagcaccg	tcacctcata	acqtqcatca	1620
	tgcatgccct	gacaacatgg	aacatcqcta	tttttctqaa	gaattatgct	cattagaaga	1680
30	tgtcgcggca	attgcagcta	ttqccaacat	cgaactaccc	ctcacgcatg	cattcatcaa	1740
	tattattcat	gcggggaaag	gcaagattaa	tccaactqqc	aaatcatcca	gcgtgattgg	1800
					cacgttttca		1860
					caaacatttg		1920
					tcatataatt		1980
35	tacgttaagc	atgtaataat	taacatgtaa	tgcatgacgt	tatttatgag	atgggttttt	2040
	atgattagag	tcccgcaatt	atacatttaa	tacgcgatag	aaaacaaaat	atagcgcgca	2100
	aactaggata	aattatcgcg	cgcggtgtca	tctatgttac	tagatcgaat	taattccagg	2160
	cggtgaaggg	caatcagctg	ttgcccgtct	cactggtgaa	aagaaaaacc	accccagtac	2220
40	attaaaaacg	tccgcaatgt	gttattaagt	tgtctaagcg	tcaatttgtt	tacaccacaa	2280
40	tatatectge	caccagccag	ccaacagete	cccgaccggc	agctcggcac	aaaatcacca	2340
	cacagetttag	geageeeate	agtccgggac	ggcgtcagcg	ggagagccgt	tgtaaggcgg	2400
	agactitige	catgitace	gatgetatte	ggaagaacgg	caactaagct	gccgggtttg	2460
	cctgtgatca	aatatcatct	ccctcccaca	gatgattgta	acgatgacag	agegregetg	2520
45	ctcgcttaac	cataccaccc	tatcastat	gaccegaatt	atcagccttc ccgacataat	accasatece	2580 2640
	tagataaaga	cactaaaaaa	actasataac	gagaactatg	tagaagtgaa	cottoaccat	2700
	gtcgacggat	cttttccact	gcataaccct	acttcagaat	cattatagcg	atttttccc	2760
	tatatccatc	ctttttcqca	cgatatacag	gattttgcca	aagggttcgt	gtagactttc	2820
	cttggtgtat	ccaacqqcqt	caqccqqqca	qqataqqtqa	agtaggccca	cccacagaca	2880
50	ggtgttcctt	cttcactgtc	ccttattcgc	acctggcggt	gctcaacggg	aatcctqctc	2940
	tgcgaggctg	gccggctacc	gccggcgtaa	cagatgaggg	caagcggatg	gctgatgaaa	3000
	ccaagccaac	caggggtgat	gctgccaact	tactgattta	gtgtatgatg	gtgtttttga	3060
	ggtgctccag	tggcttctgt	ttctatcagc	tgtccctcct	gttcagctac	tgacggggtg	3120
EE	gtgcgtaacg	gcaaaagcac	cgccggacat	cagcgctatc	tctgctctca	ctgccgtaaa	3180
55	acatggcaac	tgcagttcac	ttacaccgct	tctcaacccg	gtacgcacca	gaaaatcatt	3240
	gatatggcca	tgaatggcgt	tggatgccgg	gcaacagccc	gcattatggg	cgttggcctc	3300
	aacacgattt	tacgtcactt	aaaaaactca	ggccgcagtc	ggtaacctcg	cgcatacagc	3360
	cgggcagtga	cgtcatcgtc	tgcgcggaaa	tggacgaaca	gtggggctat	gtcggggcta	3420
60	acctattccc	taaaccaact	atagagaga	atyacagtet	ccggaagacg	gttgttgcgc	3480
00	ttaacataat	gatatogato	acggetacgc	rggggegtet	tatgagcctg	ctgtcaccct	3540
	agctgcacgt	aatcaccaac	coatataccc	accoasttos	tgaatcccgc gcggcataac	ctgaagggaa	3600 3660
	ggcagcacct	aggagggggg	ggacggaagt	cactataatt	ctcaaaatcg	atagaaataa	3660 3720
	55-25-000	23235009	Jacasadasc	ogocytoget	cicadaaccy	grygagerge	3120

			+=+=+======	+	+ a - a + a - a + +	~~~~+~~+	2700
				taaaacacta			3780
				ggtgtactgc			3840
				gagcctgtcg			3900
E				ctatgagcac			3960
5				gctgaaactc			4020
				cgccctgctg			4080
	ggacgagctt	ggcaaggtca	tgatgggcgt	ggtccgcccg	agggcagagc	catgactttt	4140
	ttagccgcta	aaacggccgg	ggggtgcgcg	tgattgccaa	gcacgtcccc	atgcgctcca	4200
	tcaagaagag	cgacttcgcg	gagctggtat	tcgtgcaggg	caagattcgg	aataccaagt	4260
10	acgagaagga	cggccagacg	gtctacggga	ccgacttcat	tgccgataag	gtggattatc	4320
	tggacaccaa	ggcaccaggc	gggtcaaatc	aggaataagg	gcacattgcc	ccggcgtgag	4380
				atcggacgtt			4440
				aggatgccga			4500
				ccgtcggctc			4560
15				ctccccctgc			4620
				aggcggcagg			4680
				agcgaaaaac			4740
				tgctgaaaca			4800
				cgtggccgga			4860
20							4920
				cgcgcaacaa aggacgtgaa			4980
							5040
				ggcagcaggt			
				tctacgagct			5100
25				aggaatgcct			5160
25				acctggaatc			5220
				cccgttgcca			5280
	tegtegtget	gtttgctggc	gaccactaca	cgaaattcat	atgggagaag	taccgcaagc	5340
				atttcagctc			5400
20				gatcggattc			5460
30				tgcgaggcag			5520
				gctagggcct			5580
				ttcaggaaca			5640
	cttgcttcgc	tcagtatcgc	tcgggacgca	cggcgcgctc	tacgaactgc	cgataaacag	5700
0.5	aggattaaaa	ttgacaattg	tgattaaggc	tcagattcga	cggcttggag	cggccgacgt	5760
35	gcaggatttc	cgcgagatcc	gattgtcggc	cctgaagaaa	gctccagaga	tgttcgggtc	5820
				ggaggcgttc			5880
	cgtggcattc	ggcgcctaca	tcgacggcga	gatcattggg	ctgtcggtct	tcaaacagga	5940
				tctgtccggc			6000
				gcgggcgttg			6060
40				ctggtggatg			6120
				gtttatttcg			6180
				gctgatggtc			6240
	gctaggtagc	ccqatacqat	tgatggcggt	cctgggggct	atttqcqqaa	ctacaaacat	6300
				gctagatcct			6360
45				cgtgctgacc			6420
				ggcggccgga			6480
				gcctacagga			6540
				ctacttcctt			6600
				ctttctcagc			6660
50							6720
00				ataccgcaca			6780
				actgactcgc			
				gtaatacggt			6840
				cagcaaaagg			6900
55	tanactana-	agterages	Laggeteege	cccctgacg	agcatcacaa	aaatcgacgc	6960
55				ctataaagat			7020
				ctgccgctta			7080
	cuccettegg	yaagcgtggc	gettteteaa	tgctcacgct	gtaggtatct	cagttcggtg	7140
	Laggicgitc	getecaaget	gggctgtgtg	cacgaacccc	ccgttcagcc	cgaccgctgc	7200
60				aacccggtaa			7260
60				gcgaggtatg			7320
				agaaggacag			7380
				ggtagctctt			7440
	gctggtagcg	gtggttttt	tgtttgcaag	cagcagatta	cgcgcagaaa	aaaaggatat	7500

	caaqaaqatc	ctttgatctt	ttctacgggg	tctgacgctc	aqtqqaacqa	aaactcacqt	7560
			attatcaaaa				7620
			ctaaagtata				7680
	tgcttaatca	gtgaggcacc	tatctcagcg	atctgtctat	ttcgttcatc	catagttgcc	7740
5			aactacgata				7800
•							7860
			acgctcaccg				
	gccggaaggg	ccgagcgcag	aagtggtcct	gcaactttat	ccgcctccat	ccagtctatt	7920
	aaacaaqtqq	caqcaacqqa	ttcgcaaacc	tgtcacgcct	tttqtqccaa	aaqccqcqcc	7980
			caggcgttag				8040
40							
10			atgctgagaa				8100
	gcacctatcc	gaccaaggct	ttgaactatc	taccagaagt	gtgagcccct	accggaagga	8160
			ctgatgaaga				8220
							8280
			aactcaactc				
	cattgttgtg	tegeacaege	accgaggcaa	aggagtcgcg	cacagtetea	tcgaatttgc	8340
15	gaaaaagtgg	qcactaaqca	gacagctcct	tggcatacga	ttagagacac	aaacgaacaa	8400
			acgcaaaatg				8460
	cacgtataaa	actagacctc	aagtctcgaa	cgaaacagcg	atgtactggt	actggttctc	8520
	gggagcacag	gatgacgcct	aacaattcat	tcaagccgac	accgcttcgc	ggcgcggctt	8580
			tgagggaagc				8640
20							8700
20			agcgccatct				
	cggctccgca	gtggatggcg	gcctgaagcc	acacagtgat	attgatttgc	tggttacggt	8760
	gaccgtaagg	cttgatgaaa	caacgcggcg	agctttgatc	aacqaccttt	tggaaacttc	8820
							8880
			agattctccg				
	cgacatcatt	ccgtggcgtt	atccagctaa	gcgcgaactg	caatttggag	aatggcagcg	8940
25	caatgacatt	cttqcaqqta	tcttcgagcc	agccacgatc	gacattgatc	tggctatctt	9000
							9060
			atagcgttgc				
	tgatccggtt	cctgaacagg	atctatttga	ggcgctaaat	gaaaccttaa	cgctatggaa	9120
	ctcgccgccc	gactgggctg	gcgatgagcg	aaatgtagtg	cttacgttgt	cccgcatttg	9180
			aaatcgcgcc				9240
30							9300
30			agcccgtcat				
	agaagatcgc	ttggcctcgc	gcgcagatca	gttggaagaa	tttgttcact	acgtgaaagg	9360
	cgagatcacc	aaqqtaqtcq	gcaaataatg	tctaacaatt	cqttcaaqcc	gacgccgctt	9420
			gcgttagaga				9480
0.5	ggtggttcta	agcetegtae	ttgcgatggc	accggggcag	gcacttgctg	acctgccaat	9540
35	tgttttagtg	gatgaagctc	gtcttcccta	tgactactcc	ccatccaact	acgacatttc	9600
			ccataagcaa				9660
							9720
			atagttcatc				
	taggcttata	tatagcgcaa	atgggtctcg	cactttcgcc	ggctactacg	tcattgccaa	9780
			tttccacatc				9840
40							9900
10			gcaaagatgg				
	tggccaattt	tegettgeee	tgacagataa	cggcctgaag	atcatgtatc	taagcaacta	9960
	gcctgctctc	taataaaatg	ttaggagctt	ggctgccatt	tttggggtga	ggccgttcgc	10020
			ggggggatgg				10080
45			ttcggcgtgc				10140
45	aaaaacaagg	tttataaata	ttggtttaaa	agcaggttaa	aagacaggtt	agcggtggcc	10200
	qaaaaacqqq	cqqaaaccct	tgcaaatgct	ggattttctg	cctqtqqaca	gcccctcaaa	10260
			atctgtcagc				10320
	ccctcatctg	tcagtagtcg	cgcccctcaa	gtgtcaatac	cgcagggcac	ttatccccag	10380
	gcttgtccac	atcatctgtg	ggaaactcgc	gtaaaatcag	gcgttttcgc	cgatttgcga	10440
50			ccggccgaaa				10500
							10560
			aagtgtcaac				
	gttttccgcg	aggtatccac	aacgccggcg	gccggccgcg	gtgtctcgca	cacggcttcg	10620
	acggcgtttc	tagcacattt	gcagggccat	agacggccgc	caqcccaqcq	gcgaggggaa	10680
							10740
55			aagggtcgac				
55	ttcccgccac	agacccggat	tgaaggcgag	atccagcaac	tcgcgccaga	tcatcctgtg	10800
	acggaacttt	ggcgcgtqat	gactggccag	gacgtcgqcc	gaaaqaqcqa	caagcaqatc	10860
			atttgcgatc				10920
			ccacagcagc				10980
. -	ccaagggatc	tttttggaat	gctgctccgt	cgtcaggctt	tccgacgttt	gggtggttga	11040
60			gaatgccagc				11100
_							11160
			gataaacctt				
	ataaacgctc	ttttctctta	ggtttacccg	ccaatatatc	ctgtcaaaca	ctgatagttt	11220
	aaactgaagg	cgggaaacga	caatctgatc	atgagcggag	aattaaqqqa	gtcacqttat	11280
			-		223		

	gacccccgcc	gatgacgcgg	gacaagccgt	tttacgtttg	gaactgacag	aaccgcaacg	11340
	attgaaggag	ccactcagcc	ccaatacgca	aaccgcctct	ccccgcgcgt	tggccgattc	11400
	attaatgcag	ctggcacgac	aggtttcccg	actggaaagc	gggcagtgag	cgcaacgcaa	11460
			cattaggcac				11520
5			agcggataac				11580
•							
			tgacactata				11640
			tgcaggcggc				11700
	aatctgagct	taacagcaca	gttgctcctc	tcagagcaga	atcgggtatt	caacaccctc	11760
	atatcaacta	ctacgttgtg	tataacggtc	cacatgccgg	tatatacqat	gactggggtt	11820
10			ggcgttcccg				11880
			gacgcgtaca				11940
				_			
			caactcaagc			-	12000
			tggctcacgc				12060
	ccccaaaaga	gatctccttt	gccccggaga	ttacaatgga	cgatttcctc	tatctttacg	12120
15	atctaggaag	gaagttcgaa	ggtgaaggtg	acgacactat	gttcaccact	gataatgaga	12180
			agaaagaatg				12240
			atctacccga				12300
							12360
			gtcaaaagat				
20			agaagtacta				12420
20	ataaaccaag	gcaagtaata	gagattggag	tctctaaaaa	ggtagttcct	actgaatcta	12480
	aggccatgca	tggagtctaa	gattcaaatc	gaggatctaa	cagaactcgc	cgtgaagact	12540
	ggcgaacagt	tcatacagag	tcttttacga	ctcaatgaca	aqaaqaaaat	cttcqtcaac	12600
			ggtctactcc				12660
			tcaacaaagg				12720
25							12780
20			catcgaaagg				
			aaaggctatc				12840
	aaagatggac	ccccacccac	gaggagcatc	gtggaaaaag	aagacgttcc	aaccacgtct	12900
			tgacatctcc				12960
	tatccttcgc	aagacccttc	ctctatataa	ggaagttcat	ttcatttgga	gaggacacgc	13020
30			aaagctgaac				13080
			aaaaaacaga				13140
			ttagatggta				13200
							13260
			ctgccaactt				
25			cagcctactc				13320
35			ggtgcgagcc				13380
	acctattcat	atacgctagt	gtcatagtcc	tgaaaatcat	ctgcatcaag	aacaatttca	13440
	caactcttat	acttttctct	tacaagtcgt	tcggcttcat	ctggattttc	agcctctata	13500
			ttctgtaatt				13560
			atattcccca				13620
40							
70			cagccacttc				13680
			gccagctttc				13740
			gcagacgtgc				13800
	gggcgtgtca	ataatatcac	tctgtacatc	cacaaacaga	cgataacggc	tctctcttt	13860
	ataggtgtaa	accttaaact	gcatttcacc	agtccctqtt	ctcqtcaqca	aaaqaqccqt	13920
45			acctcagcca				13980
	caacacacaa	acgacgggct	tcattctgca	taattatact	taccadacco	nanatattna	14040
	catcatatat	acettasace	actgatagct	ataatata	accugaccy	taataaaata	14100
	cttcatagea	Caccicitt	tgacatactt	egggtagtge	cgatcaacgt	ctcattttcg	14160
			tcccggtatc				14220
50			gtatttattc				14280
	cttagtcgac	tacaggtcac	taataccatc	taagtagttg	attcatagtg	actggatatg	14340
			tagtctgttt				14400
			ctcgttcagc				14460
			aattattttc				14520
55							
55			taataatata				14580
			aacatagtaa				14640
			gagtaagtat				14700
	aagatgatat	actagcatta	atatttgttt	taatcataat	agtaattcta	gctggtttga	14760
	tgaattaaat	atcaatgata	aaatactata	gtaaaaataa	gaataaataa	attaaaataa	14820
60			tttattatat				14880
			tattttgtta				14940
	aaacaaaata	ttaaataaca	agctaaagta	30222+22+2	taaaaataat	accedence	15000
	atotastota	202222025	atataataat	acadatadid	aggarant +	ayaaacayta	
	ucciaacyta	acadacata	atctaatgct	aalaladCdā	aycycaagat	CLACCATTT	15060

```
atatagtatt attiticaatc aacattiitta tiaattiicta aataatactt gtagtittat 15120
         taacttctaa atggattgac tattaattaa atgaattagt cgaacatgaa taaacaaggt 15180
         aacatgatag atcatgtcat tgtgttatca ttgatcttac atttggattg attacagtta 15240
         cttaccttaa gcttggatcc tctagaccac tttgtacaag aaagctgaac gagaaacgta 15300
         aaatgatata aatatcaata tattaaatta gattttgcat aaaaaacaga ctacataata 15360
         ctgtaaaaca caacatatcc agtcactatg aatcaactac ttagatggta ttagtgacct
         gtagtcgact aagttggcag catcacccga cgcactttgc gccgaataaa tacctgtgac
         ggaagatcac ttcgcagaat aaataaatcc tggtgtccct gttgataccg ggaagccctg
         ggccaacttt tggcgaaaat gagacgttga tcggatttca caactcttat acttttctct
    10
         tacaagtcgt tcggcttcat ctggattttc agcctctata cttactaaac gtgataaagt
         ttctgtaatt tctactgtat cgacctgcag actggctgtg tataagggag cctgacattt
         atattcccca gaacatcagg ttaatggcgt ttttgatgtc attttcgcgg tggctgagat
         cagecactte tteccegata acggagaceg geacactgge catateggtg gteateatge
         gccagctttc atccccgata tgcaccaccg ggtaaagttc acgggagact ttatctgaca
    15
         gcagacgtgc actggccagg gggatcacca tccgtcgccc gggcgtgtca ataatatcac
         tctgtacatc cacaaacaga cgataacggc tctctctttt ataggtgtaa accttaaact
         gcatttcacc agtccctgtt ctcgtcagca aaagagccgt tcatttcaat aaaccgggcg
         acctcagcca tecetteetg atttteeget ttecagegtt eggeaegeag aegaeggget
         tcattctgca tggttgtgct taccagaccg gagatattga catcatatat gccttgagca
    20
         actgataget gtegetgtea actgteactg taataegetg etteatagea eacetetttt
         tgacatactt ctgttcttga tgcagatgat tttcaggact atgacactag cgtatatgaa
                                                                             16320
         taggtagatg tttttatttt gtcacacaaa aaagaggctc gcacctcttt ttcttatttc
                                                                             16380
         tttttatgat ttaatacggc attgaggaca atagcgagta ggctggatac gacgattccg
                                                                             16440
tttgagaaga acatttggaa ggctgtcggt cgactaagtt ggcagcatca cccgaagaac
                                                                             16500
    25
         atttggaagg ctgtcggtcg actacaggtc actaatacca tctaagtagt tgattcatag
         tgactggata tgttgtgttt tacagtatta tgtagtctgt tttttatgca aaatctaatt
         taatatattg atatttatat cattttacgt ttctcgttca gcttttttgt acaaacttgt
         ctagagtcct gctttaatga gatatgcgag acgcctatga tcgcatgata tttgctttca
                                                                             16740
         attotgttgt gcacgttgta aaaaacctga gcatgtgtag ctcagatcct taccgccggt
    30
         ttcggttcat tctaatgaat atatcacccg ttactatcgt atttttatga ataatattct
         ccgttcaatt tactgattgt accctactac ttatatgtac aatattaaaa tgaaaacaat
         atattgtgct gaataggttt atagcgacat ctatgataga qcqccacaat aacaaacaat 16980
         tgcgttttat tattacaaat ccaattttaa aaaaagcggc agaaccggtc aaacctaaaa 17040
         gactgattac ataaatctta ttcaaatttc aaaaggcccc aggggctagt atctacgaca 17100
    35
         caccgagcgg cgaactaata acgttcactg aagggaactc cggttccccg ccggcgcgca 17160
         tgggtgagat tccttgaagt tgagtattgg ccgtccgctc taccgaaagt tacgggcacc 17220
         attcaacccg gtccagcacg gcggccgggt aaccgacttg ctgccccgag aattatgcag 17280
         catttttttg gtgtatgtgg gccccaaatg aagtgcaggt caaaccttga cagtgacgac
         aaatcgttgg gcgggtccag ggcgaatttt gcgacaacat gtcgaggctc agcaggacct
    40
         gcaggcatgc aagctagctt actagtgatg catattctat agtgtcacct aaatctgc
         <210>
                26
         <211>
                17681
   45
         <212>
                DNA
         <213>
                Artificial sequence
         <220>
         <223>
                acceptor vector pHELLSGATE12
   50
         <400>
         ggccgcacta gtgatatece geggccatgg eggeegggag catgegaegt egggeecaat
                                                                                60
         tegecetata gtgagtegta ttacaattea etggeegteg ttttacaaeg tegtgaetgg
                                                                               120
         gaaaaccctg gcgttaccca acttaatcgc cttgcagcac atcccccttt cgccagctgg
                                                                               180
   55
         cgtaatagcg aagaggcccg caccgatcgc ccttcccaac agttgcgcag cctgaatggc
                                                                               240
         gaatggaaat tgtaaacgtt aatgggtttc tggagtttaa tgagctaagc acatacgtca
                                                                               300
         gaaaccatta ttgcgcgttc aaaagtcgcc taaggtcact atcagctagc aaatatttct
                                                                               360
         tgtcaaaaat gctccactga cgttccataa attcccctcg gtatccaatt agagtctcat
                                                                               420
         attcactctc aatccaaata atctgcaatg gcaattacct tatccgcaac ttctttacct
                                                                               480
   60
         atttccgccc ggatccgggc aggttctccg gccgcttggg tggagaggct attcggctat
                                                                               540
         gactgggcac aacagacaat cggctgctct gatgccgccg tgttccggct gtcagcgcag
                                                                               600
         gggcgcccgg ttctttttgt caagaccgac ctgtccggtg ccctgaatga actgcaggac
                                                                               660
         gaggcagcgc ggctatcgtg gctggccacg acgggcgttc cttgcgcagc tgtgctcgac
                                                                               720
```

	gttgtcactg	aagcgggaag	ggactggctg	ctattgggcg	aagtgccggg	gcaggatctc	780
			tgccgagaaa				840
			tacctgccca				900
	cgagcacgta	ctcggatgga	agccggtctt	gtcgatcagg	atgatctgga	cgaagagcat	960
5			actgttcgcc				1020
			cgatgcctgc				1080
			tggccggctg				1140
			tgaagagctt				1200
			cgattcgcag				1260
10			gggttcgaaa				1320
. •			gccgccttct				1380
							1440
			ctccagcgcg				1500
			gcaacgtcca				
15			gtctcaattc				1560
10			gggaatactg				1620
			aacatcgcta				1680
			ttgccaacat				1740
			gcaagattaa				1800
20			tgattcgttt				1860
20			gtgcgtcgaa				1920
	ttcttaagat	tgaatcctgt	tgccggtctt	gcgatgatta	tcatataatt	tctgttgaat	1980
			taacatgtaa				2040
	atgattagag	tcccgcaatt	atacatttaa	tacgcgatag	aaaacaaaat	atagcgcgca	2100
	aactaggata	aattatcgcg	cgcggtgtca	tctatgttac	tagatcgaat	taattccagg	2160
25	cggtgaaggg	caatcagctg	ttgcccgtct	cactggtgaa	aagaaaaacc	accccagtac	2220
			gttattaagt				2280
			ccaacagctc				2340
			agtccgggac				2400
			gatgctattc				2460
30	aaacacggat	gatctcgcgg	agggtagcat	qttqattqta	acqatqacaq	agcattacta	2520
	cctqtqatca	aatatcatct	ccctcgcaga	gatccgaatt	atcagcette	ttattcattt	2580
	ctcgcttaac	cqtqacaqqc	tgtcgatctt	gagaactatg	ccgacataat	aggaaatcgc	2640
	tggataaagc	cqctqaqqaa	gctgagtggc	gctatttctt	tagaagtgaa	cattaacaat	2700
	gtcgacggat	cttttccqct	gcataaccct	acttcagaat	cattatagcg	attttttccc	2760
35			cgatatacag				2820
	cttggtgtat	ccaacggcgt	cagccgggca	ggataggtga	antagneese	Seadacesee	2880
	gatatteett	cttcactqtc	ccttattcgc	acctagagat	agtaggeeea	aatcctcctc	2940
	tacaaaacta	accaactacc	gccggcgtaa	cadatdaddd	caaccaata	actcetgete	3000
	ccaagccaac	caggggtgat	gctgccaact	tactcattta	atatataata	geegaegaaa	3060
40	agtactccaa	taacttctat	ttctatcagc	tatagataat	gracacatag	tanagagata	3120
. •	gracataaca	ggettetge	caccaacat	caccactate	tetestetas	atagagtasa	3120
	acatogcaac	tacaattaa	cgccggacat	tatanagaa	gtagggagga	cigolytaaa	
	gatatggcca	tgaatggcat	ttacaccgct	ggaagggg	gracycacca	gadaattatt	3240
	aacaccattt	tacataaatt	tggatgccgg	gcaacagccc	geattatggg	cgrtggcctc	3300
45	aacacgattt	catgitatt	aaaaaactca	ggeegeagee	ggtaacctcg	cgcatacage	3360
70	astagagaga	aggatagata	tgcgcggaaa	tggacgaaca	gtggggctat	greggggera	3420
	aattytytta	gegerggerg	ttttacgcgt	algacagtet	ccggaagacg	gttgttgcgc	3480
	acguattegg	tgaacgcact	atggcgacgc	tggggcgtct	tatgagcctg	ctgtcaccct	3540
	ttgacgtggt	gatatggatg	acggatggct	ggccgctgta	tgaatcccgc	ctgaagggaa	3600
50	agetgeaegt	aatcagcaag	cgatatacgc	agcgaattga	gcggcataac	ctgaatctga	3660
50	ggcagcacct	ggcacggctg	ggacggaagt	cgctgtcgtt	ctcaaaatcg	gtggagctgc	3720
	atgacaaagt	catcgggcat	tatctgaaca	taaaacacta	tcaataagtt	ggagtcatta	3780
	cccaaccagg	aagggcagcc	cacctatcaa	ggtgtactgc	cttccagacg	aacgaagagc	3840
	gattgaggaa	aaggcggcgg	cggccggcat	gagcctgtcg	gcctacctgc	tggccgtcgg	3900
EF	ccagggctac	aaaatcacgg	gcgtcgtgga	ctatgagcac	gtccgcgagc	tggcccgcat	3960
55	caatggcgac	ctgggccgcc	tgggcggcct	gctgaaactc	tggctcaccg	acgacccgcg	4020
	cacggcgcgg	ttcggtgatg	ccacgatcct	cgccctgctg	gcgaagatcg	aagagaagca	4080
	ggacgagctt	ggcaaggtca	tgatgggcgt	ggtccgcccg	agggcagagc	catgactttt	4140
	ttagccgcta	aaacggccgg	ggggtgcgcg	tgattgccaa	gcacgtcccc	atgcgctcca	4200
00	tcaagaagag	cgacttcgcg	gagctggtat	tcgtgcaggg	caagattcgg	aataccaagt	4260
60	acgagaagga	cggccagacg	gtctacggga	ccgacttcat	tgccgataag	gtggattatc	4320
	tggacaccaa	ggcaccaggc	gggtcaaatc	aggaataagg	gcacattgcc	ccggcgtgag	4380
	tcggggcaat	cccgcaagga	gggtgaatga	atcggacgtt	tgaccggaag	gcatacaggc	4440
	aagaactgat	cgacgcgggg	ttttccgccg	aggatgccga	aaccatcgca	agccgcaccg	4500

	tcatgcgtgc	gccccgcgaa	accttccagt	ccgtcggctc	gatggtccag	caagctacgg	4560
	ccaagatcga	gcgcgacagc	gtgcaactgg	ctccccctgc	cctgcccgcg	ccatcggccg	4620
	ccgtggagcg	ttcgcgtcgt	ctcgaacagg	aggcggcagg	tttggcgaag	tcgatgacca	4680
	tcgacacgcg	aggaactatg	acgaccaaga	agcgaaaaac	cgccggcgag	gacctggcaa	4740
5	aacaggtcag	cgaggccaag	caggccgcgt	tgctgaaaca	cacgaagcag	cagatcaagg	4800
	aaatgcagct	ttccttgttc	gatattgcgc	cgtggccgga	cacgatgcga	gcgatgccaa	4860
	acgacacggc	ccgctctgcc	ctgttcacca	cgcgcaacaa	gaaaatcccg	cgcgaggcgc	4920
	tgcaaaacaa	ggtcattttc	cacgtcaaca	aggacgtgaa	gatcacctac	accqqcqtcq	4980
	agctgcgggc	cgacgatgac	gaactggtgt	ggcagcaggt	gttggagtac	qcqaaqcqca	5040
10			accttcacgt				5100
			acgaaggccg				5160
	cqatqqqctt	cacqtccqac	cgcgttgggc	acctggaatc	gatatcacta	ctgcaccgct	5220
	tccacatcct	ggaccgtggc	aagaaaacgt	cccattacca	ggtcctgatc	gacgaggaaa	5280
			gaccactaca				5340
15	tatcaccaac	aacccaacaa	atgttcgact	atttcagctc	acaccadaaa	ccatacccac	5400
	tcaagctgga	aaccttcccc	ctcatgtgcg	gatcggattc	cacccacata	aagaagtggc	5460
	acaaacaaat	caacassacc	tgcgaagagt	tacasaacsa	caacataata	gaagagegge	5520
	gggtcaatga	taacctaata	cattgcaaac	actagageag	tatacatca	gaacacgccc	5580
	ggggttcagc	agccagggg	ttactggcat	ttcaccaaca	agggggggg	geteeggeeg	5640
20	cttacttcac	tcactatcac	tcgggacgca	caaagaata	tagaggcact	getegaegea	
	aggattaaaa	ttgacaattg	taattaaaa	tgagattga	gaggttgg	cgacaaacag	5700
	aggactada	coccacates	tgattaaggc	ccagactega	cggcttggag	tattaget	5760
	catttacaa	caccaccacca	gattgtcggc	cccgaagaaa	geteeagaga	tgttegggte	5820
	catacastta	cacgaggaga	aaaagcccat	ggaggegeee	gergaaeggr	tgegagatge	5880
25	agagggggg	ggegeetaea	tcgacggcga	gateattggg	ctgtcggtct	tcaaacagga	5940
20	ggacggcccc	aaggacgctc	acaaggcgca	tetgteegge	gttttegtgg	agcccgaaca	6000
	gegaggeega	ggggtegeeg	gtatgctgct	gegggegttg	ccggcgggtt	tattgctcgt	6060
	gatgategte	tagatata	caacgggaat	etggtggatg	cgcatcttca	tecteggege	6120
	actidatati	regetattet	ggagcttgtt	gtttatttcg	gtctaccgcc	tgccgggcgg	6180
30	ggtegeggeg	acggtaggcg	ctgtgcagcc	gctgatggtc	gtgttcatct	ctgccgctct	6240
30	getaggtage	ccgatacgat	tgatggcggt	cctgggggct	atttgcggaa	ctgcgggcgt	6300
	ggcgctgttg	gtgttgacac	caaacgcagc	gctagatcct	gtcggcgtcg	cagcgggcct	6360
	ggcgggggcg	gtttccatgg	cgttcggaac	cgtgctgacc	cgcaagtggc	aacctcccgt	6420
	gcctctgctc	acctttaccg	cctggcaact	ggcggccgga	ggacttctgc	tcgttccagt	6480
35	agetttagtg	tttgatccgc	caatcccgat	gcctacagga	accaatgttc	teggeetgge	6540
33	gtggctcggc	ctgatcggag	cgggtttaac	ctacttcctt	tggttccggg	ggatctcgcg	6600
	actegaacet	acagttgttt	ccttactggg	ctttctcagc	cgggatggcg	ctaagaagct	6660
	attgccgccg	atcttcatat	gcggtgtgaa	ataccgcaca	gatgcgtaag	gagaaaatac	6720
	egeateagge	getetteege	ttcctcgctc	actgactcgc	tgcgctcggt	cgttcggctg	6780
40	cggcgagcgg	tatcagctca	ctcaaaggcg	gtaatacggt	tatccacaga	atcaggggat	6840
40	aacgcaggaa	agaacatgtg	agcaaaaggc	cagcaaaagg	ccaggaaccg	taaaaaggcc	6900
	gcgttgctgg	cgtttttcca	taggctccgc	ccccctgacg	agcatcacaa	aaatcgacgc	6960
	tcaagtcaga	ggtggcgaaa	cccgacagga	ctataaagat	accaggcgtt	tccccctgga	7020
	agctccctcg	tgcgctctcc	tgttccgacc	ctgccgctta	ccggatacct	gtccgccttt	7080
ΛE	ctcccttcgg	gaagcgtggc	gctttctcaa	tgctcacgct	gtaggtatct	cagttcggtg	7140
45	taggtcgttc	gctccaagct	gggctgtgtg	cacgaacccc	ccgttcagcc	cgaccgctgc	7200
	gccttatccg	gtaactatcg	tcttgagtcc	aacccggtaa	gacacgactt	atcgccactg	7260
	gcagcagcca	ctggtaacag	gattagcaga	gcgaggtatg	taggcggtgc	tacagagttc	7320
	ttgaagtggt	ggcctaacta	cggctacact	agaaggacag	tatttggtat	ctgcgctctg	7380
EΩ	ctgaagccag	ttaccttcgg	aaaaagagtt	ggtagctctt	gatccggcaa	acaaaccacc	7440
50	gctggtagcg	gtggtttttt	tgtttgcaag	cagcagatta	cgcgcagaaa	aaaaggatat	7500
	caagaagatc	ctttgatctt	ttctacgggg	tctgacgctc	agtggaacga	aaactcacgt	7560
	taagggattt	tggtcatgag	attatcaaaa	aggatcttca	cctagatcct	tttaaattaa	7620
	aaatgaagtt	ttaaatcaat	ctaaagtata	tatgagtaaa	cttggtctga	cagttaccaa	7680
	tgcttaatca	gtgaggcacc	tatctcagcg	atctgtctat	ttcgttcatc	catagttgcc	7740
55	tgactccccg	tcgtgtagat	aactacgata	cgggagggct	taccatctgg	ccccagtgct	7800
	gcaatgatac	cgcgagaccc	acgctcaccg	gctccagatt	tatcagcaat	aaaccagcca	7860
	gccggaaggg	ccgagcgcag	aagtggtcct	gcaactttat	ccgcctccat	ccaqtctatt	7920
	aaacaagtgg	cagcaacgga	ttcgcaaacc	tgtcacgcct	tttgtgccaa	aaqccqcqcc	7980
00	aggtttgcga	tccgctgtgc	caggcgttag	gcgtcatatg	aagatttcgg	tgatccctga	8040
60	gcaggtggcg	gaaacattgg	atgctgagaa	ccatttcatt	gttcgtgaag	tgttcgatgt	8100
	gcacctatcc	gaccaaggct	ttgaactatc	taccagaagt	gtgagcccct	accqqaaqqa	8160
	ttacatctcg	gatgatgact	ctgatgaaga	ctctgcttgc	tatggcgcat	tcatcqacca	8220
	agagcttgtc	gggaagattg	aactcaactc	aacatggaac	gatctagcct	ctatcgaaca	8280
					5	-	

	cattgttgtg	tcgcacacgc	accgaggcaa	aggagtcgcg	cacagtctca	tcgaatttgc	8340
			gacagctcct				8400
							8460
			acgcaaaatg				
_	cacgtataaa	actagacctc	aagtctcgaa	cgaaacagcg	atgtactggt	actggttctc	8520
5	gggagcacag	gatgacgcct	aacaattcat	tcaagccgac	accgcttcgc	ggcgcggctt	8580
			tgagggaagc				8640
			agcgccatct				8700
	cggctccgca	gtggatggcg	gcctgaagcc	acacagtgat	attgatttgc	tggttacggt	8760
			caacgcggcg				8820
10							
10			agattctccg				8880
			atccagctaa				8940
	caatgacatt	cttgcaggta	tcttcgagcc	agccacgatc	gacattgatc	tqqctatctt	9000
			atagcgttgc				9060
4 =			atctatttga				9120
15	ctcgccgccc	gactgggctg	gcgatgagcg	aaatgtagtg	cttacgttgt	cccgcatttg	9180
	gtacaqcqca	gtaaccqqca	aaatcgcgcc	gaaggatgtc	gctgccgact	gggcaatgga	9240
			agcccgtcat				9300
			gcgcagatca				9360
	cgagatcacc	aaggtagtcg	gcaaataatg	tctaacaatt	cgttcaagcc	gacgccgctt	9420
20			gcgttagaga				9480
			ttgcgatggc				9540
	tgttttagtg	gatgaagctc	gtcttcccta	tgactactcc	ccatccaact	acgacatttc	9600
	tccaagcaac	tacqacaact	ccataagcaa	ttacqacaat	agtccatcaa	attacqacaa	9660
	ct.ct.gagagc	aactacqata	atagttcatc	caattaccac	aataqtcqca	acquaaatcq	9720
25	tagggttata	+2+200000	atageteace	anattacgae	aacagccgca	Lastanas	
20	taygettata	tatagegeaa	atgggtctcg	cactttegee	ggctactacg	tcattgccaa	9780
	caatgggaca	acgaacttct	tttccacatc	tggcaaaagg	atgttctaca	ccccaaaagg	9840
	ggggcgcggc	gtctatggcg	gcaaagatgg	gagettetge	ggggcattgg	tcqtcataaa	9900
			tgacagataa				9960
20			ttaggagctt				10020
30	ggccgagggg	cgcagcccct	ggggggatgg	gaggcccgcg	ttagcgggcc	gggagggttc	10080
	qaqaaqqqqq	qqcacccccc	ttcggcgtgc	acaatcacac	accadadacac	agccctggtt	10140
	aaaaacaadd	tttataaata	ttggtttaaa	accacattaa	3-430300++	ngaaataaaa	10200
	222222222		teggettaaa	agcaggctaa	aayacayytt	ageggeggee	
	gaaaaacggg	cggaaaccct	tgcaaatgct	ggattttctg	cctgtggaca	gcccctcaaa	10260
	tgtcaatagg	tgcgcccctc	atctgtcagc	actctgcccc	tcaagtgtca	aggatcgcgc	10320
35	ccctcatctq	tcagtagtcg	cgcccctcaa	gtgtgaatac	cacagaacac	ttatccccag	10380
	acttatacac	atcatctctc	cassactaca	gtanantono	agattttaga	aaatttaaaa	
	geregeeeae	accaccigig	ggaaactcgc	gradaarcag	gegeeeege	cgatttgcga	10440
	ggctggccag	ctccacgtcg	ccggccgaaa	tcgagcctgc	ccctcatctg	tcaacgccgc	10500
	gccgggtgag	teggeeete	aagtgtcaac	gtccgcccct	catctgtcag	tgagggccaa	10560
	attttccaca	aggtatccac	aacgccggcg	accaaccaca	atateteaca	cacqqcttcq	10620
40	acconditto	tagagagattt	ucacccca+	3003300303	gogocogoa	aaaaaaaaa	
. •	acggcgcccc	eggegegeee	gcagggccat	agacggccgc	cayeecayey	gegagggeaa	10680
	ccagcccggt	gagcgtcgga	aagggtcgac	atcttgctgc	gttcggatat	tttcgtggag	10740
	ttcccgccac	agacccggat	tgaaggcgag	atccagcaac	tcqcqccaqa	tcatcctqtq	10800
	acqqaacttt	gacacataat	gactggccag	gacgtcggcc	gaaagaggga	caadcadatc	10860
	accattttcc	22222222	atttaggata	222225	gaaagagega	stantan	
45			atttgcgatc				10920
40	gaccgcgttg	agggatcaag	ccacagcagc	ccactcgacc	ttctagccga	cccagacgag	10980
	ccaagggatc	tttttggaat	gctgctccgt	cqtcaqqctt	tccgacgttt	gggtggttga	11040
	acagaagtca	ttatcgtacg	gaatgccagc	actocoana	accetat	aattaaceta	11100
	dadatadaaa	taasaassaa	224222222	********	ggaaccccgc	ggccggcacg	
	Cacacacaa	tygacgaacg	gataaacctt	ttcacgccct	tttaaatatc	cgttattcta	11160
	ataaacgctc	ttttctctta	ggtttacccg	ccaatatatc	ctgtcaaaca	ctgatagttt	11220
50	aaactgaagg	cqqqaaacqa	caatctgatc	atgagcggag	aattaaggga	gtcacgttat	11280
	gacccccccc	gatgacgcgg	gacaagccgt	tttacattta	naactracar	3300003300	11340
	2++02200300	gacgacgcgg	gacaageege	a a a a a a a a a a a a a a a a a a a	gaactgacag	aaccycaacy	
	artgaaygag	ccactcagec	ccaatacgca	aaccgcctct	ccccgcgcgt	tggccgattc	11400
	attaatgcag	ctggcacgac	aggtttcccg	actggaaagc	gggcagtgag	cgcaacgcaa	11460
	ttaatqtqaq	ttagctcact	cattaggcac	cccagacttt	acactttato	cttccaactc	11520
55			agcggataac				11580
	3++3000309	agtattage	tononatate	aaccccacac	aggaaacagc	catgactatg	
	accacgeeda	gulattagg	tgacactata	yaatactcaa	gctatgcatc	caacgcgttg	11640
	ggagctctcc	catatcgacc	tgcaggcggc	cgctcgacga	attaattcca	atcccacaaa	11700
			gttgctcctc				11760
			tataacggtc				11820
60	atacaaacca		gagatta	anatter:	annatatyat	5466999966	
00	gracaaagge	yycaacaaac	ggcgttcccg	yayttgcaca	caagaaattt	gccactatta	11880
	cagaggcaag	agcagcagct	gacgcgtaca	caacaagtca	gcaaacagac	aggttgaact	11940
	tcatccccaa	aggagaaqct	caactcaagc	ccaaqaqctt	tactaaaacc	ctaacaagcc	12000
	caccaaagca	aaaagcccac	tggctcacgc	taggaaccae	330000000000	agtgatgag	12060
			-550004090	Jugguaceaa	auggeeeage	agegatedag	12000

	ccccaaaaga	gatctccttt	gccccggaga	ttacaatgga	cgatttcctc	tatctttacg	12120
						gataatgaga	12180
						gaggcctacg	12240
			atctacccga				12300
5						aacacagaga	12360
						ggcttgcttc	12420
			gagattggag				12480
			gattcaaatc				12540
			tcttttacga				12600
10			ggtctactcc				12660
	caaaqqqcta	ttgagacttt	tcaacaaagg	ataatttccc	gaaacctcct	cggattccat	12720
			catcgaaagg				12780
			aaaggctatc				12840
			gaggagcatc				12900
15	tcaaagcaag	tagattgata	tgacatctcc	actgacgtaa	aagaagaaaa	acaatcccac	12960
	tateettege	aagacccttc	ctctatataa	graagttcat	ttcatttcca	daddacacac	13020
	traggaraag	tttgtagaaa	aaaggtgaag	ggaageceae	aaatoatata	aatatcaata	13020
							13140
			aaaaaacaga				13200
20			ttagatggta				
20	taaaagaaa	testastata	ctgccaactt	agregacega	tageetteea	aatgttette	13260
	ccaaacggaa	anananana	cagcctactc	getattgtee	teaatgeegt	attaaatcat	13320
			ggtgcgagcc				13380
	acctattcat	atacgctagt	gtcatagtcc	tgaaaatcat	ctgcatcaag	aacaatttca	13440
25	caactcttat	acttttctct	tacaagtcgt	teggetteat	ctggattttc	agcctctata	13500
25	cttactaaac	gtgataaagt	ttctgtaatt	tctactgtat	cgacctgcag	actggctgtg	13560
	tataagggag	cctgacattt	atattcccca	gaacatcagg	ttaatggcgt	ttttgatgtc	13620
	attttcgcgg	tggctgagat	cagccacttc	ttccccgata	acggagaccg	gcacactggc	13680
			gccagctttc				13740
20	acgggagact	ttatctgaca	gcagacgtgc	actggccagg	gggatcacca	tccgtcgccc	13800
30	gggcgtgtca	ataatatcac	tctgtacatc	cacaaacaga	cgataacggc	tctctctttt	13860
	ataggtgtaa	accttaaact	gcatttcacc	agtccctgtt	ctcgtcagca	aaagagccgt	13920
	tcatttcaat	aaaccgggcg	acctcagcca	tcccttcctg	attttccgct	ttccagcgtt	13980
	cggcacgcag	acgacgggct	tcattctgca	tggttgtgct	taccagaccg	gagatattga	14040
25	catcatatat	gccttgagca	actgatagct	gtcgctgtca	actgtcactg	taatacgctg	14100
35	cttcatagca	cacctctttt	tgacatactt	cgggtagtgc	cgatcaacgt	ctcattttcg	14160
	ccaaaagttg	gcccagggct	tcccggtatc	aacagggaca	ccaggattta	tttattctgc	14220
	gaagtgatct	tccgtcacag	gtatttattc	ggcgcaaagt	gcgtcgggtg	atgctgccaa	14280
	cttagtcgac	tacaggtcac	taataccatc	taagtagttg	attcatagtg	actggatatg	14340
40	ttgtgtttta	cagtattatg	tagtctgttt	tttatgcaaa	atctaattta	atatattgat	14400
40	atttatatca	ttttacgttt	ctcgttcagc	tttcttgtac	aaagtggtct	cgaggaattc	14460
			aaataattat				14520
			attataataa				14580
	tataaatata	ttgtttacat	aaacaacata	gtaatgtaaa	aaaatatgac	aagtgatgtg	14640
4.5	taagacgaag	aagataaaag	ttgagagtaa	gtatattatt	tttaatgaat	ttgatcgaac	14700
45	atgtaagatg	atatactagc	attaatattt	gttttaatca	taatagtaat	tctagctggt	14760
	ttgatgaatt	aaatatcaat	gataaaatac	tatagtaaaa	ataagaataa	ataaattaaa	14820
	ataatatttt	tttatgatta	atagtttatt	atataattaa	atatctatac	cattactaaa	14880
	tattttagtt	taaaagttaa	taaatatttt	gttagaaatt	ccaatctgct	tgtaatttat	14940
	caataaacaa	aatattaaat	aacaagctaa	agtaacaaat	aatatcaaac	taatagaaac	15000
50	agtaatctaa	tgtaacaaaa	cataatctaa	tgctaatata	acaaaqcqca	agatctatca	15060
	ttttatatag	tattatttc	aatcaacatt	cttattaatt	tctaaataat	acttqtaqtt	15120
	ttattaactt	ctaaatggat	tgactattaa	ttaaatgaat	tagtcgaaca	tgaataaaca	15180
	aggtaacatg	atagatcatg	tcattgtgtt	atcattgatc	ttacatttqq	attgattaca	15240
	gttgggaagc	tgggttcgaa	atcgataagc	ttqcqctqca	gttatcatca	tcatcataga	15300
55	cacacgaaat	aaagtaatca	gattatcagt	taaaqctatq	taatatttqc	gccataacca	15360
	atcaattaaa	aaataqatca	gtttaaagaa	agatcaaagc	tcaaaaaaat	ааааададаа	15420
	aagggtccta	accaaqaaaa	tgaaggagaa	aaactagaaa	tttacctoca	caagettgga	15480
	tcctctagac	cactttqtac	aagaaagctg	aacqaqaaac	gtaaaatgat	ataaatatca	15540
	atatattaaa	ttagattttg	cataaaaaac	agactacata	atactotasa	acacaacata	15600
60	tccagtcact	atgaatcaac	tacttagatg	gtattagtga	cctataatca	actaagttgg	15660
	cagcatcacc	cqacqcactt	tacaccaaat	aaatacctgt	gacggaagat	cacttcccac	15720
	aataaataaa	tectgatate	cctqttqata	ccdddaaadd	ctagaccaac	ttttggcgaa	15780
	aatgagacgt	tgatcggatt	tcacaactct	tatacttttc	tcttacaaot	cattcaactt	15840
	3 3 3 -	5 55				-339	1010

	catctggatt	ttcagcctct	atacttacta	aacgtgataa	agtttctgta	atttctactg	15900
	tatcgacctg	cagactggct	gtgtataagg	gagcctgaca	tttatattcc	ccagaacatc	15960
					gatcagccac		16020
					tgcgccagct		16080
5	atatgcacca	ccgggtaaag	ttcacgggag	actttatctg	acagcagacg	tgcactggcc	16140
	agggggatca	ccatccgtcg	cccgggcgtg	tcaataatat	cactctgtac	atccacaaac	16200
					actgcatttc		16260
					gcgacctcag		16320
					gcttcattct		16380
10	gcttaccaga	ccggagatat	tgacatcata	tatgccttga	gcaactgata	gctgtcgctg	16440
					ttttgacata		16500
	tgatgcagat	gattttcagg	actatgacac	tagcgtatat	gaataggtag	atgtttttat	16560
	tttgtcacac	aaaaaagagg	ctcgcacctc	tttttcttat	ttctttttat	gatttaatac	16620
					ccgtttgaga		16680
15					aacatttgga		16740
					tagtgactgg		16800
					atttaatata		16860
					tgtctagagt		16920
					tcaattctgt		16980
20					ggtttcggtt		17040
					tctccgttca		17100
					aatatattgt		17160
					aattgcgttt		17220
					aaagactgat		17280
25					acacaccgag		17340
					gcatgggtga		17400
					accattcaac		17460
					cagcattttt		17520
00					gacaaatcgt		17580
30					cctgcaggca	tgcaagctag	17640
	cttactagtg	atgcatattc	tatagtgtca	cctaaatctg	С		17681